

Emotion regulation, attention and mindfulness in adolescents with social,  
emotional and behavioural difficulties.

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## **Abstract**

Social, emotional, and behavioural difficulties (SEBD) impact significantly on the life, education, and psychological wellbeing of adolescents. A central factor in the development and maintenance of SEBD is emotion regulation (the ability to regulate emotional responses). Emotion regulation has been linked to attention and mindfulness, where studies have showed positive correlations between these constructs. Mindfulness-based interventions are beginning to be widely used, however have been studied very little in adolescents with SEBD, despite this population being recognised as having distinct difficulties with emotion regulation and attention, and a group in need of helpful interventions. Furthermore, there is little research exploring the mechanisms underlying mindfulness, particularly in adolescents. The present study aimed to investigate the relationships between emotion regulation, attention and mindfulness in adolescents with SEBD and controls. In particular, the study explored the mediating role of attention in the relationship between mindfulness and emotion regulation, and looked specifically at the effect of varying levels of callous-unemotional traits on these relationships. Adolescents aged 11-16 with identified SEBD and controls participated in the study which used self-reported and teacher-rated questionnaires as well as cognitive tasks to measure levels of SEBD, emotion regulation, attention and trait mindfulness. The results showed there were significant positive correlations between emotion regulation, attention and mindfulness in adolescents with SEBD and in controls, when using particular measures of these variables. Attention was found to significantly mediate the relationship between mindfulness and emotion regulation. The results, however, showed little support for any differences between the relationships between these constructs in those with

varying levels of callous-unemotional traits. The results are helpful in adding to theories surrounding emotion regulation, attention and mindfulness in adolescents, particularly in adolescents with SEBD, where research is more limited, and have important implications for developing and tailoring interventions in both clinical and educational settings.

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## **Chapter 1: Introduction**

### **1.1 Overview**

Social, emotional, and behavioural difficulties (SEBD) impact significantly on the daily life, functioning, education, and psychological wellbeing of adolescents. The number of adolescents considered to have SEBD is rising (Flynn, 2013). It is therefore important to explore important factors in SEBD and strategies to manage and improve these difficulties. Emotion regulation is the ability to regulate one's own emotions and emotional responses (Gross, 1998), and has been described as a central component in the development of SEBD in adolescents (Silk, Steinberg & Morris, 2003). Attention, defined as a complex cognitive system by which we allocate information processing towards a specific stimulus (Zelazo et al., 2013), has been found to be a key strategy by which individuals regulate emotions (Xing & Isaacowitz, 2006), and strategies and interventions to train attention have been found to be effective at improving emotion regulation. One way to train attention is with mindfulness interventions (Chambers, Chuen Yee Lo, & Allen, 2008). Mindfulness has most commonly been defined as "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally" (Kabat-Zinn, 1994, p.4). Mindfulness-based treatment interventions are becoming increasingly popular and are beginning to develop a well-supported evidence base for their use in both adults (Khoury et al., 2013) and children and adolescents (Frank, Jennings & Greenberg, 2013; Meiklejohn et al., 2012; Weare, 2013). Although adolescents with SEBD are recognised as having distinct difficulties with emotion regulation and portray a group in need of helpful interventions, mindfulness has been studied very little in this population. In a small number of studies, however, mindfulness has been shown to improve emotion

regulation, attention, and aggressive behaviours in adolescents with SEBD (Bogels, Hoogstead, Van Dun, de Schutter & Restifo, 2008; Kuyken et al., 2013; Weare, 2013).

There is little research exploring the processes and mechanisms underlying mindfulness (Chiesa, Serretti, & Jakobsen, 2013), an account of which is said to be necessary in order for mindfulness-based interventions to be completely empirically validated (Hayes & Wilson, 2003). Specifically, although mindfulness interventions have been found to have effects on emotion regulation (Metz, Frank, Reibel, Cantrell, Sanders, & Broderick, 2013) and attention (Bogels et al., 2008), there is a lack of research exploring the relationships between these constructs together. Additionally, exploration of these relationships in children and adolescents, a significant developmental period when these constructs are likely to be developing (Silk et al., 2003) are said to be particularly lacking (Semple, Lee, Rosa, & Miller, 2010). Given that the mechanisms by which mindfulness-based interventions are effective are unclear (Raes, Griffith, Van der Gucht, & Williams, 2014), it is important for research to explore this for future interventions to specifically target these mechanisms.

To address these gaps in the existing literature, the present study aimed to investigate the relationships between emotion regulation, attention and mindfulness in adolescents with SEBD and controls. The study also explored the mediating role of attention in the relationship between mindfulness and emotion regulation, and the effect of varying levels of callous-unemotional traits in those with conduct problems on these relationships.

This chapter will define the population of adolescents with SEBD, including conduct problems, and explore the constructs of emotion regulation, attention and mindfulness, in relation to this population.

## **1.2 Social, emotional, and behavioural difficulties**

Social, emotional, and behavioural difficulties (SEBD) refer to any problem or difficulty one has in relation to these areas of development. The Department for Children, Schools, and Families (2008, p.12) define SEBD as “features of emotional and behavioural difficulties such as: being withdrawn or isolated, disruptive and disturbing; being hyperactive and lacking concentration; having immature social skills; or presenting challenging behaviours arising from other complex special needs”. They describe that SEBD can include children and adolescents with diagnosable conditions such as emotional disorders (including anxiety and depression), conduct disorders and hyperkinetic disorders (including attention deficit disorder and attention deficit hyperactivity disorder), as well as those whose general behaviour or emotional wellbeing are seen to be deteriorating. SEBD in adolescents have been shown to have impacted significantly on family life, social functioning and education (Gutman & Vorhaus, 2012; Renzaho, Mellor, McCabe, & Powell, 2013). Longitudinal studies have also found that adolescents with SEBD have an increased risk of mental health problems, educational underachievement, unemployment, and being involved in crime in later life (Fergusson & Woodward, 2000; 2002; Newton-Howes, 2004). It is therefore important to develop and explore effective interventions to support this population.

A crucial factor in the development and maintenance of SEBD in adolescence is emotion regulation. Studies have consistently found that maladaptive emotion



regulation strategies are predictive of SEBD in adolescents, while good emotion regulation is protective against such difficulties (Kim-Spoon, Cicchetti, & Rogosch, 2013; McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011; Silk et al., 2003), making it an important construct to explore further in this population.

### *Conduct Problems and Callous-Unemotional Traits in SEBD*

Conduct problems are a specific type of SEBD. Conduct problems have been defined as including “a spectrum of antisocial, aggressive, dishonest, delinquent, defiant and disruptive behaviours” (Blissett et al., 2009 p.13) and are reflected in the Diagnostic and Statistical Manual of Mental Disorders (5<sup>th</sup> ed., APA, 2013) categories for conduct disorder and oppositional defiant disorder (Frick & Morris, 2004).

Within adolescents displaying conduct problems, it is evident that there are subgroups who show different types of behaviours (Frick & White, 2008); research has explored levels of callous-unemotional traits as an indicator of these subgroups in adolescents with conduct problems. Callous-unemotional traits are defined as a lack of guilt and empathy, and a callous use of others (Frick & White, 2008), and have been found to be related to more severe aggression, violence and antisocial behaviour in those with severe conduct problems (Frick, Stickle, Dandreaux, Farrell, & Kimonis, 2005; Frick & White, 2008).

Biopsychosocial theories of adolescent psychopathology propose that callous-unemotional traits may portray a distinctive developmental pathway to conduct problems (Frick & White, 2008). It is suggested that differences in the developmental mechanisms mean there are significant differences between those with low levels of callous-unemotional traits and those with high levels, where research has shown that

high levels of callous-unemotional traits are linked to more significant cognitive and emotional processing deficits (Frick & Viding, 2009; Munoz, Frick, Kimonis, & Aucoin, 2008). Theories suggest that those with low levels of callous-unemotional traits show higher reactivity to emotion than both typically-developing children and those with high levels (Sharp, van Goozen, & Goodyer, 2006), which are important differences to consider when exploring emotion regulation in this population.

The current research was conducted with a population of adolescents with SEBD, and also specifically explored the role of callous-unemotional traits. The following sections will outline the constructs of emotion regulation, attention and mindfulness generally, and in relation to SEBD, conduct problems, and callous-unemotional traits.

### **1.3 Emotion Regulation**

#### *Definition*

Emotion regulation has been defined as the “processes responsible for monitoring, evaluating and modifying emotional reactions” (Thompson, 1994 p.27), in other words, the ability to regulate one’s own emotions and emotional responses (Gross, 1998). Other definitions similarly describe emotion regulation as the conscious and unconscious processes which modulate emotions (Bargh & Williams, 2007), and define the importance of regulating emotions in order to respond appropriately to one’s environment (Campbell-Sills & Barlow, 2007). Some definitions have emphasised that emotion regulation is not simply decreasing negative emotion and increasing positive emotions, but more importantly, the transitioning between the two (Diamond & Aspinwall, 2003; Wadlinger & Isaacowitz, 2011).

### Emotion regulation strategies

Attempts to modify or change any situation, experience, or thought related to an experience of emotion are referred to as emotion regulation strategies. Gross (1998) proposed a process model of emotion regulation (see Figure 1) in which he described different emotion regulation strategies in relation to where they take place during the process of an emotional event. He proposed that two types of emotion regulation strategy exist: antecedent-focused and response-focused emotion regulation strategies. The former are used early in the process of generating emotions and are said to alter the *input* to the emotion-generative system, by deliberately re-interpreting emotional stimuli, for example, cognitive reappraisal strategies. Response-focused emotion regulation strategies, on the other hand, supposedly modify the *output* of the system, and are used once an emotion is already generated, such as emotion suppression strategies (Gross, 1998; Chiesa et al., 2013). Several emotion regulation strategies have been proposed and can be categorised into the following: situation-selection strategies, whereby an individual takes action to make it more or less likely they will be in situations they desire or do not desire; situation modification, in which individuals attempt to modify the situation and, as a result, the emotional impact of it; attentional deployment strategies, which refer to how individuals direct their attention to affect their emotions; cognitive change strategies, in which individuals cognitively appraise the situation and how they think about it; and response modification strategies, which refer to direct attempts to impact on physiological or behavioural responses to emotion, for example, the use of anti-anxiety drugs (Gross, 2007).

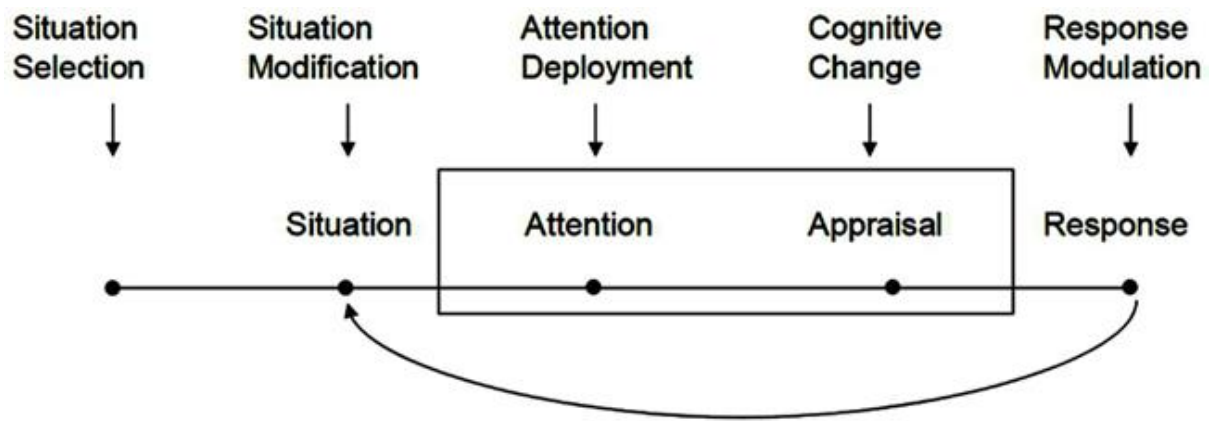


Figure 1: Process model of emotion regulation reproduced from Gross and Thompson (2007, p. 10).

While this model has been helpful in understanding the different emotion regulation strategies that can be implemented, it is limited by only focusing on the stage of implementation (Sheppes, Suri, & Gross, 2015). These authors recently updated the model to highlight other important stages said to be necessary in understanding both the adaptive and maladaptive profiles of emotion regulation. Sheppes et al. (2015) developed an extended process model which distinguishes three stages of emotion regulation: identification (deciding whether to regulate or not), selection (deciding which strategy to use) and implementation (putting a strategy into place).

Emotion regulation strategies can be further categorised into adaptive and maladaptive strategies. Adaptive emotion regulation strategies include cognitive reappraisal (where positive perspectives of a situation are produced), problem solving (the attempt to change a situation or its outcome), and acceptance of emotions, which have all been associated with positive psychological well-being (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Conversely, maladaptive emotion regulation strategies have been found to relate to psychopathology (Aldao et al., 2010; Mennin & Farach, 2007). Rumination (the repeated focus on the cause, consequences and

experience of emotion), avoidance (of emotions, thoughts and emotional experiences) and suppression (of thoughts and emotions) are all considered maladaptive emotion regulation strategies (Aldao et al., 2010).

### *Development of emotion regulation strategies*

Emotion regulation is suggested to begin developing in childhood, initially by caregivers demonstrating and supporting children to learn to cope in distressing situations, and is something which one starts to initiate themselves over time (Berking & Wupperman, 2012). Researchers have highlighted the period from childhood to adolescence as a crucial time in the development of emotion regulation (Thompson, 1994), during which there is development in a number of other areas also, for example, social development, conceptual understanding and biological changes (Gross, 2007). Although emotion regulation has been proposed to continue developing throughout adulthood (Charles & Carstensen, 2007), adolescence, in particular, is highlighted in the development of emotion regulation, as it is a time when emotions begin to be understood in more complex ways (Gross, 2007), and during which there are significant changes in the experience and processing of emotions (Silk et al., 2003), however few studies have directly explored emotion regulation in adolescents (Neumann, van Lier, Gratz, & Koot, 2010).

### *Emotion regulation and mental health*

Emotion regulation is considered an essential component of healthy social and emotional development (Kim-Spoon et al., 2013). Unsurprisingly, there has been a significant amount of research investigating the effects of emotion regulation abilities, and much of it has looked into the relationship between emotion regulation and

mental health. While a good ability to regulate one's emotions has been associated with positive psychological functioning and well-being (Nyklicek, Vingerhoets, & Zeelenberg, 2011), in contrast, poor, or dysfunctional, emotion regulation has been found to be associated with poorer psychological well-being and increased mental health difficulties (Aldao et al., 2010).

In their recent extended process model of emotion regulation, Sheppes et al. (2015) described how different psychological disorders and symptoms can map onto the different stages of emotion regulation. For example, they described that potential failure points at the stage of identification might lead to panic attacks in anxiety, while failure points in implementation could relate to symptoms of ADHD where there is an underrepresentation of adaptive regulatory strategies (Sheppes et al., 2015).

Indeed previous research has found that certain diagnosable disorders are characterised by a poor ability to regulate emotions, for example, depression and anxiety disorders (Mennin, Holloway, Fresco, Moore, & Heimberg, 2007). Research has consistently found that maladaptive or poor emotion regulation strategies are linked to more distress and diagnosable mental health conditions including depression, anxiety, eating disorders, substance misuse and borderline personality disorder (Mennin et al., 2007; Sher, & Grekin, 2007; Tragesser et al., 2010). Emotion regulation difficulties have been reliably related to depression in both longitudinal studies, where emotion dysregulation has been found to predict levels of depression two years later (Kraaij, Pruymboom, & Garnefski, 2002), and in experimental studies where depression has been found to be associated with difficulties using adaptive emotion regulation strategies (Liverant, Brown, Barlow, & Roemer, 2008) and associated with an increased use of maladaptive emotion regulation strategies in

comparison to healthy controls (Ehring, Tuschen-Caffier, Schnulle, Fischer, & Gross, 2010). In their recent meta-analysis looking at the relationships between different emotion regulation strategies and psychopathology, Aldao et al. (2010) found that overall maladaptive emotion regulation strategies such as rumination, avoidance and suppression led to more psychopathology (as measured by diagnoses of depression, anxiety, substance misuse and eating disorders), with varying effect sizes. Conversely, they found that adaptive emotion regulation strategies such as acceptance, reappraisal and problem solving were associated with less psychopathology. Interestingly, they found that maladaptive strategies were more strongly related to psychopathology (as indicated by larger effect sizes), but also that different strategies interacted with certain disorders differently. For example, the results revealed that rumination had a large effect size in relation to depression, but a medium effect size when associated with substance misuse and eating disorders, suggesting that while emotion regulation appears to play a significant role in mental health difficulties in general, the relationship is somewhat complex. Meta-analytic research benefits from combining the results from several studies, therefore giving an overall result, however this study was limited by the number of studies into certain emotion regulation strategies being too small to conduct some effect sizes. The effect size, for example, for acceptance was small, but non-significant, perhaps due to being understudied.

### *Emotion regulation and SEBD*

Dysfunctional emotion regulation has been described as a central correlate of SEBD in adolescents (Silk et al., 2003). Several studies have found a negative association between emotion regulation and SEBD in adolescents, where poorer emotion regulation skills have been found to be related to higher levels of depressive and

anxiety symptoms, as well as aggression and problem behaviour (McLaughlin et al., 2011; Silk et al., 2003). McLaughlin et al. (2011) concluded that poor emotion regulation is a key factor in adolescent psychopathology from their prospective, longitudinal study of adolescents aged 11-14 years attending school in an urban US community. They found that emotion dysregulation predicted an increase in several difficulties including anxiety and aggressive behaviour in this population. While these research findings are significant and important, much of the research on emotion regulation in adolescents is limited by the sole use of self-report questionnaires to measure emotion regulation, the limitations of which are outlined later on.

Two recent studies that have made attempts to overcome the limitations of using only self-report measures looked at the relationship between emotion regulation and SEBD using questionnaires of emotion regulation scored by other informants. Kim and Cicchetti (2010) explored the longitudinal relationship between emotion regulation, peer acceptance and rejection, and psychopathology in a study of over 400 children attending a summer camp. Counsellors were trained to complete assessments and score the children on measures of emotion regulation and internalising and externalising symptoms, which included withdrawal, somatic complaints, anxiety, depression, and aggressive behaviours. The results showed that lower emotion regulation ability was associated with higher levels of externalising and internalising symptoms as well as peer rejection. Better emotion regulation was related to, and predictive of, higher social competence and peer acceptance, and lower levels of psychopathology. In a similar study, Kim-Spoon et al. (2013) also studied children attending a camp programme. Using the same counsellor-rated measures as Kim and Cicchetti (2010), this study also found a relationship between emotion regulation and



SEBD in children, where lower emotion regulation ability was a significant predictor of internalising symptoms, and predicted an increase in symptoms from one year to the next. The results also revealed that emotion regulation played a mediating role between early childhood maltreatment (measured via records of neglect) and internalising symptoms, showing the important role emotion regulation plays in the development, as well as presence, of SEBD in children and adolescents.

While these studies overcome the limitations of only using self-reported data, the use of multiple informants (for example, both self-reported and other-rated measures) would have been useful and increased the reliability of the data. Furthermore, children only attended the camp for a week-long period, therefore how well the counsellors knew the children prior to rating them can be questioned. Both studies, however, provide data from a large number of participants, and look at the longitudinal effects of emotion regulation, which is helpful in understanding how emotion regulation affects psychopathology in the long term, although in one study a large amount of data was missing in the longitudinal analysis (Kim-Spoon et al., 2013) which limits the conclusions that can be drawn.

Nevertheless, this recent research has demonstrated a significant relationship between emotion regulation and SEBD, and highlighted the importance of good emotion regulation skills as a protective factor against these difficulties. However, the exact roles emotion dysregulation plays in SEBD are difficult to research and understand fully given the breadth of the definition of the term 'SEBD', which encompasses both internalising and externalising problems.

### Emotion regulation and conduct problems

As described above, there has been a significant amount of research linking poor emotion regulation to SEBD in adolescents (for example, Silk et al., 2003).

Unsurprisingly, adolescents specifically with conduct problems have also been shown to have emotion regulation difficulties, and have been found to experience emotion more intensely than others (Macklem, 2008), suggesting emotion regulation may play a particularly central role here also. Studies exploring the relationships between emotion regulation and conduct problems, consistently show that those with conduct problems have difficulties regulating their emotions (Frick, 2004; Frick & Morris, 2004; Loney, Frick, Clements, Ellis, & Kerlin, 2003). In particular, conduct problems have been linked to high levels of negative emotional reactivity in male adolescents (Loney et al., 2003), and low levels of effort to control or regulate this reactivity (Eisenberg et al., 2001). Prospective studies have also demonstrated that difficulties in regulating emotions are predictive of aggressive behaviour in adolescents (McLaughlin et al., 2011) and of conduct problems more generally (Frick & Morris, 2004). While emotion regulation deficiencies lead to conduct problems in adolescents, good emotion regulation skills are hypothesised to protect at risk children from developing conduct problems (Beauchaine, Gatzke-Kopp, & Mead, 2007), portraying the key role emotion regulation difficulties play in the development of conduct problems.

As described above, there are distinct categories of adolescents with conduct problems: those with low levels of callous-unemotional traits and those with high levels. Adolescents with conduct problems and low levels of callous-unemotional traits show higher reactivity to emotion (Sharp et al., 2006) and therefore tend to show

more reactive behaviours and aggression (aggressive behaviour shown in response to others' behaviour that is deemed threatening), while those with high levels of callous-unemotional traits show greater levels of proactive aggression (aggression that is unprovoked and goal-oriented) (Fite, 2009). Frick and Morris (2004) proposed that emotion regulation difficulties are seen more in adolescents who display reactive aggression and low levels of callous-unemotional traits, as this group have difficulties inhibiting their behaviour when emotionally aroused. They are unlikely, however, to play a role in adolescents who display proactive aggression and high levels of callous-unemotional traits. Research has supported this where reactive aggression has been found to be associated with higher cortisol reactivity than proactive aggression (Lopez-Duran, Olson, Hajal, Vazquez, & Felt, 2009), and found to be uniquely associated with poor emotion regulation abilities, after controlling for proactive aggression (Marsee & Frick, 2007). Although some studies have found that reactive and proactive aggression do not differ greatly in their relationships to self-regulation (for example, Xu, Farver, & Zhang, 2009), in such studies self-regulation included both emotional and behavioural regulation; it is possible that different aspects of self-regulation are associated with different types of aggression but existing measures are not good at differentiating these (Eisenberg, Spinrad, & Eggum, 2010).

Emotion regulation has been identified as a central developmental pathway to conduct problems, and a number of direct and indirect pathways have been proposed through which emotion regulation difficulties might lead to conduct problems (Frick & Morris, 2004). For example, a child's expression of emotion early on may interfere with the development of adaptive emotion regulation strategies. This may be through a caregiver's lack of appropriate responding to emotion, such as the child's emotional

outbursts, which mean the child does not learn to control or cope with their emotions (Frick & Morris, 2004; Weis, 2014). Emotion regulation difficulties can further lead to the development of conduct problems through the child's relationships with others. The quality of the parental interactions, for example, may be affected by the child's lack of emotion regulation abilities, which may make the parent respond with hostility, therefore modelling aggression or hostile behaviours (Weis, 2014), demonstrating the role of emotion regulation in the development of conduct problems. Given these difficulties in emotion regulation, it is not surprising that adolescents with conduct problems have also been found to be at an increased risk of depression and anxiety, and to have higher rates of suicide, suicidal thoughts and suicide attempts (Nock, Hwang, Sampson, & Kessler, 2010; Shaffer et al., 1996). Considering this, and the recent rise in diagnosable conduct problems in adolescents (Scott, 2012), there is a need for interventions and strategies to reduce these symptoms and support this population.

### *Measuring emotion regulation*

As the interest in emotion regulation has grown, the number of tools available to measure it has also developed. Emotion regulation has been measured via self-report questionnaires, using observational measures and through cognitive tasks developed to tap into it. Of course, there are strengths and limitations to each of the methods. This section will outline and evaluate different methods of measuring emotion regulation.

*a) Self-report measures*

A number of good self-report questionnaires have been developed to measure emotion regulation. Self-report measures require the participant to report on their own emotion regulation strategies. These are generally relatively quick and easy to administer, and do not require the time of others, for example, clinicians, making them efficient for research purposes. They also measure dispositional emotion regulation, in other words, emotion regulation as a trait across both time and context, which is helpful in order to generalise findings (Aldao et al., 2010). There are of course limitations to using self-report measures. In general, there may be difficulties with self-presentation and social-desirability biases, for example, individuals wanting to present themselves in a certain way, either to come off in a more positive manner, or to respond in ways which they think the researcher is looking for rather than selecting answers that honestly reflect themselves (Fisher & Katz, 2000). Considering measures of emotion regulation specifically, self-report measures of emotional awareness have been criticised for being paradoxical (Berking & Wupperman, 2012) and it has been argued that individuals might not actually have the ability, or enough insight, to accurately report on their own emotion regulation strategies (Aldao et al., 2010), or be aware of their emotions and strategies to regulate them (Shepherd & Wild, 2014). It has also been debated whether self-report measures of emotion regulation are appropriate to use with children (Molina et al., 2014). Nevertheless, given the benefits of administering self-report measures, they continue to be widely used, and have contributed to the growing evidence base on emotion regulation.

*b) Other-rated measures*

Using questionnaires rated by other informants is one way of overcoming the limitations of self-report measures. Other-rated measures are questionnaires which use items describing a person's behaviour to assess emotion regulation and are scored by other people familiar with the person, for example, parents, teachers, and clinicians. Other-rated measures are criticised, however, particularly in relation to measuring emotion regulation, as other informants cannot know and access all emotion related information about an individual (Molina et al., 2014).

*c) Observational measures*

Again overcoming some of the limitations of self-report measures, studies have also used observational methods to measure emotion regulation. These include instructing participants to engage in a particular emotion regulation strategy, for example, rumination or thought suppression, and observing the emotional, cognitive and/or physiological effects after being exposed to emotive stimuli (for example, Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Although these methods can be helpful in eliminating self-report biases, they are time-consuming, costly, and do not tap into the dispositional or long-term effects of emotion regulation strategies, but only assess the short-term effects of different strategies. Moreover, the ecological validity of these methods can be questioned, where many factors, for example, the instructions on how to engage in a particular emotion regulation strategy, or the surroundings of the experiment could affect performance, creating difficulties in generalising the findings outside of these settings (Berking & Wupperman, 2012). Furthermore, it can be difficult to know and measure how far an individual is actually engaging in an emotion regulation strategy, and even more difficult for individuals to engage in such

strategies on instruction. Difficulties in suppressing thoughts on instruction, for example, have been well-documented (Wegner, Schneider, Carter, & White, 1987).

*d) Cognitive tasks*

More recently, computerised cognitive measures of emotion regulation have been developed and utilised. Tasks such as emotional n-back tasks (Ladouceur et al., 2009), emotional stroop tasks (Sebastian, Viding, Williams, & Blakemore, 2010; Williams, Mathews, & MacLeod, 1996) and emotional alphabet tasks (Dumontheil, Hassan, Gilbert, & Blakemore, 2010) all incorporate an emotional element into existing, well-validated cognitive tasks to assess the effects of the emotional component as a measure of emotion regulation. The emotional n-back task for example is a measure of implicit emotion regulation which evaluates the interference of different emotions (via fearful, sad, happy, or neutral faces) on a working memory task (Ladouceur et al., 2009). The use of computerised cognitive tasks in measuring emotion regulation have obvious benefits in overcoming the limitations of self- or other-reported measures. Individuals are presented with emotional information, often task-irrelevant, which taps directly into their emotional experience, and implicit regulation of response to emotion (Remy, 2012). Additionally, they can capture further elements of emotion regulation, such as hypervigilance to emotion, which cannot be easily accessed with self-report measures, as well as directly measuring actual performance, which self-report measures cannot.

In summary, this section has explored what is meant by emotion regulation, described different emotion regulation strategies used, and highlighted adolescence as an important period in which these develop. Research has demonstrated that emotion regulation difficulties are significant in those with SEBD, including conduct

problems, making this an important area to explore further. This section has also outlined different methods available to measure emotion regulation. Given the strengths and limitations of different methods, a good strategy to measure a construct more completely is to combine different methods.

#### **1.4 Attention**

##### *Definition*

Attention, and different aspects of attention, have been defined in several ways. Early definitions broadly describe attention as the selecting and focusing in of our experience of the world (Wallace, 1999). Posner and Petersen (1990) proposed that attention is a complex system of three network stages: alerting, orienting, and executive control, which are related systems but work independently from one another (see Figure 2). Alerting is said to be the network by which attention can make a fast response through an intensified internal awareness. Orienting is used to guide attention towards selective inputs, and executive control is used to direct planning and error detection (Posner, Sheese, Odludas, & Tang, 2006). While this theory has received support, there is debate about the components of attention, with alternative theories proposing that attention is made up of different fundamental elements (Wadlinger & Isaacowitz, 2011).



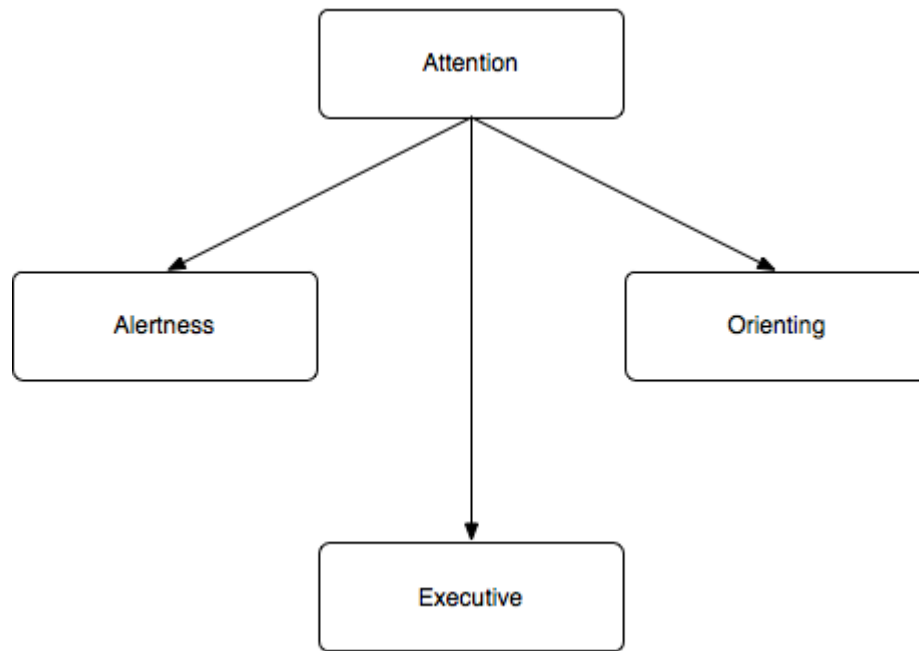


Figure 2: The components of attention based on Posner & Petersen (1990).

### Attention and emotion regulation

#### *Attention as an emotion regulation strategy*

Attention is not only related to emotion regulation but is considered an important emotion regulation strategy (Gelow, 2013). As described in the previous section, Gross (1998) developed a model of emotion regulation in which he named five key emotion regulation strategies; attentional deployment being one of them. Attentional deployment is defined as an antecedent emotion regulation strategy through which individuals use attention to influence and shape their experience of emotion. Gross (1998) further described three strategies which occur within attentional deployment: distraction (the shifting of attention from one aspect of a situation to another), concentration (using cognitive resources to attend to and focus on a particular aspect or activity) and rumination (directing attention to feelings and their consequences).

There has been sufficient evidence to support that attentional deployment is an effective emotion regulation strategy. Studies have shown that an increased selective attention to positive words is related to a more positive mood (Tamir & Robinson, 2007). Conversely, attending to negative information has been associated with a negative mood. Joorman and Gotlib (2007) found that individuals who had previously been diagnosed with depression had an attentional bias to negative faces as compared to neutral or happy faces, showing that individuals selectively attend to negative stimuli even after an episode of depression. Further supporting the role of attention in emotion regulation, it has been found that when instructed to regulate their emotions, individuals use attention as a means of doing so. Xing and Isaacowitz (2006) compared participants across three conditions: individuals who were instructed to regulate emotions while watching a series of images, individuals who were told to focus on the information given in the images, and individuals who were told to attend to the images as if they were watching television. They found that those who were explicitly instructed to use emotion regulation strategies paid less attention to the negative images as compared to the positive images, and on the whole, attended to all images less than those in the other conditions, suggesting that direction of attention is used as an emotion regulation strategy. While these studies support the role of attention in emotion regulation, they did not use any real time measures of emotion, or measure self-report emotion or emotion regulation (Wadlinger & Isaacowitz, 2011).

Nevertheless, more recent theorists have proposed that attentional deployment is the most crucial emotion regulation strategy, and although considered an antecedent strategy, it can in fact be effectively employed at any stage of the emotion generation process (Koole, 2009) making it a key strategy. Van Reekum et al. (2007) studied the

relationships between different emotion regulation strategies, and found that after accounting for attention, as measured by eye movements (looking away from certain stimuli), the effects of using cognitive reappraisal disappeared, suggesting that attentional deployment may be a key component of cognitive appraisal, supporting the role of attention in emotion regulation.

### *Training attention to improve emotion regulation*

Given the central role it appears to play in emotion regulation, it is not surprising that research has demonstrated that training one's attention can influence emotion regulation. Training gaze, clinical attention training and meditative training are different methods that have been developed to train attention in order to improve emotion regulation and, as a result, mood.

#### *a) Gaze training*

Several tasks that train gaze patterns have been developed and include cognitive tasks such as dot probe tasks, flanker tasks and emotional stroop tasks, which all reorient attention towards particular information (Wadlinger & Isaacowitz, 2011). The dot probe task, for example, presents pairs of words, one of which is neutral and one of which is emotional. Afterwards, a visual probe (an arrow) is presented, and individuals have to determine the direction of the arrow. Training using the dot probe task involves the consistent use of the probe towards the neutral word, in order to draw attention away from the negative word. Studies have demonstrated that training individuals to redirect attention away from negative information or stimuli using this task was effective at reducing symptoms of anxiety, as rated by both self and clinicians (Amir, Beard, Burns, & Bomyea, 2009).

Supporting this, Wadlinger and Isaacowitz (2008) also demonstrated an effect of dot probe training on emotion regulation. This study found that following training to attend to positive information, individuals in this condition attended to negative images less than prior to training, showing that they had learned to redirect their attention away from negative images, a successful emotion regulation strategy. However, these tasks are criticised for affecting emotion regulation processes rather than outcomes (Wadlinger & Isaacowitz, 2011). Although the majority of this research has been done in adults, more recently, studies have also shown the positive effects of gaze training on clinical outcomes in children (Waters, Pittaway, Mogg, Bradley, & Pine, 2013).

*b) Clinical attention training*

Clinical attention training methods have also been developed to enable individuals to redirect attention from negative, internal, emotional information, toward external, neutral, sensory information (Wells, 1990). This training was developed to encourage individuals to focus their attention on environmental sounds as a method of disengaging with their thoughts. Clinical attention training has been found to reduce clinical symptoms in different diagnosed disorders such as panic disorder (Wells, 1990) and more recently depression (Siegle, Ghinassi, & Thase, 2007), suggesting that training attention has resulted in more effective emotion regulation strategies, which in turn has affected symptoms of emotional disorders. However, most of the research in this area has been limited to small sample sizes, and to clinical populations, meaning there are limits to how far these results can be generalised to other populations.

### *c) Meditative attention training*

Attention training has also been developed into forms of meditation, which involve learning to direct attention to external information in the environment, or to specific aspects (Wadlinger & Isaacowitz, 2011). Mindfulness training is a specific type of meditation where attention is directed towards certain things, for example, one's breathing, or body sensations. Section 1.5 discusses mindfulness in detail.

Although each of these attention training methods have been found to be effective at improving emotion regulation, the evidence base is limited. The majority of the research into attention training has been conducted with small samples, and only brief interventions, with none being able to demonstrate the long term effects of the training (Wadlinger & Isaacowitz, 2011). There is the need, therefore, for further research to investigate the effects of different attention training and the relationship to emotion regulation more thoroughly.

In summary, this section has described what is understood by the term 'attention', and how attention relates to emotion regulation. Evidence of attention as an emotion regulation strategy, and how attention training can improve emotion regulation has been highlighted. Mindfulness was briefly described as an attention training method that could improve emotion regulation. Given the key role emotion regulation plays in SEBD, it is important that there are methods for improving it. The next section outlines what mindfulness is, critically evaluates research supporting the efficacy of its use with different populations, including those with SEBD, and in particular conduct problems, and describes the roles of emotion regulation and attention in relation to mindfulness.

## **1.5 Mindfulness**

### **Definition**

Mindfulness is a secular approach stemming from Buddhism, which relates to an awareness of what is happening around us (Bodhi, 2011). Currently, many different definitions and conceptualisations of mindfulness exist (Ritchie & Bryant, 2012), and there are significant differences between these varying definitions (Grossman, 2008). Traditional definitions of mindfulness, as understood in Buddhist practice, describe mindfulness as a complex and ongoing process with several features including a deliberate awareness of the present moment, maintained by qualities such as kindness, patience, and acceptance (Bodhi, 2000). Mindfulness, from this conceptualisation, is said to be inseparable from other similar qualities such as positive emotion and ethical principles of doing no harm, and is something achievable only through long term training (Gunaratana, 2002). Modern definitions of mindfulness include Kabat-Zinn's popular definition which describes mindfulness as "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally" (Kabat-Zinn, 1994, p.4). Although different conceptualisations of mindfulness still exist, there is generally a consensus among modern definitions that mindfulness involves focusing attention on the present moment (Richie & Bryant, 2012), however such conceptualisations have been criticised for narrowing down the concept of mindfulness into a single aspect (Chiesa, 2012).

### **State versus Trait Mindfulness**

As described, mindfulness has been operationalised in different ways, and has been described to have both state- and trait-like characteristics (Bullis, Boe, Asnaani, &

Hofmann, 2014). As a trait-like construct, mindfulness is assumed to be a dispositional quality or pattern of behaviour across all aspects of daily life (Tanay & Bernstein, 2013). As with other traits, there are individual differences in trait mindfulness, which are thought to have developed through genetic predisposition, environmental factors, and training (Davidson, 2010). Trait mindfulness has been found to correlate negatively with a range of psychological difficulties and common mental health problems including depression, anxiety, stress (Cash & Whittingham, 2010), and difficulties in emotion regulation (Coffey, Hartman, & Fredrickson, 2010), as well as to positively correlate with positive well-being factors such as self-esteem and life satisfaction (Brown & Ryan, 2003). Despite demonstrating these associations, much of the research on trait mindfulness is limited by its correlational nature, from which causality cannot be inferred. However, more recently, experimental studies, which have more control than correlational studies, have demonstrated that trait mindfulness is associated with reactivity and responses in anxiety and stress (Arch & Craske, 2010; Brown, Weinstein & Creswell, 2012; Bullis et al., 2014). Despite these recent developments, research on trait mindfulness is still said to be quite sparse and inconsistent (Desrosiers, Vine, Curtiss, & Klemanski, 2014).

Mindfulness has also been viewed and measured as a state-like construct or “a state of conscious awareness” (Langer, 1992, p.289), in other words, a mental behaviour which is variable and dependent on context (Sauer et al., 2013), responsive to mindfulness practice (Bishop et al., 2004) and maintained only when attention is directed to experience (Lau et al., 2006). As a state, mindfulness has been researched through mindfulness-enhancing training or interventions which enhance the state of mindfulness through practice and meditation (Lyvers, Makin, Toms, Thorberg &

Samios, 2014). These interventions have been shown to be effective at improving mindfulness abilities (Zeidan, Johnson, Diamond, David & Goolkasian, 2010) and are beginning to develop a good evidence base in the treatment of a range of psychological difficulties in adults (Hwang & Kearney, 2013; Khoury et al., 2013; Toneatto, Pillai, & Courtice, 2014), as described in detail below.

### *Measuring Mindfulness*

A number of self-report psychometric measures of mindfulness have been developed. These can be distinguished as those measuring mindfulness as a single faceted trait in comparison to a multi-faceted trait, as well as those measuring mindfulness as a trait as opposed to a state.

Several of the scales developed measure mindfulness as a single faceted construct, whereby ‘present-centred attention’ is the main feature being measured (Chiesa, 2012). Examples of these are the Mindful Attention Awareness Scale (MAAS; Brown and Ryan, 2003) and the Freiburg Mindfulness Inventory (FMI; Buchheld, Grossman, & Walach, 2001). These measures however, have been criticised for not capturing the complexity of the construct of mindfulness, as traditionally understood (Chiesa, 2012) and in contrast, measures operationalising mindfulness as a multi-faceted trait have been developed.

Baer, Smith and Allen (2004) developed and validated the use of the Kentucky Inventory of Mindfulness Skills (KIMS) which incorporates four aspects of mindfulness: observing, describing, acting with awareness and accepting without judgement, therefore measuring a general inclination to be mindful in everyday life. The same authors developed a further measure of mindfulness: Five Factors



Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006), which, in addition to the four aspects of mindfulness included in the KIMS includes nonreactivity (acceptance) as a factor of mindfulness. All of these factors (apart from observing) were found to be significant components of an overall mindfulness construct in a factor analysis (Baer et al., 2006). Additionally, more recent research has found support that mindfulness is a multi-faceted construct (Christopher, Neuser, Michael, & Baitmangalkar, 2012; Richie & Bryant, 2012). Importantly, different facets or aspects of mindfulness have been found to be relevant clinically, for example, the describing facet was found to be inversely related to anxiety, while noticing and attending were found to positively relate to anxiety (Desrosiers, Vine, Klemanski & Nolen-Hoeksema, 2013).

While these measures operationalise mindfulness as a trait-like construct, there have also been measures developed which measure mindfulness as a state. The Toronto Mindfulness Scale (TMS; Lau et al., 2006) and more recently the State Mindfulness Scale (SMS; Tanay & Bernstein, 2013), for example, operationalise mindfulness as a state that is sustained when attention is purposely directed to experiences, and measures a mindful state following techniques to induce this. While most of these scales have been shown to have good psychometric properties (de Bruin, Topper, Muskens, Bogels, & Kamphuis, 2012; Tanay & Bernstein, 2013) there are several limitations to them. A significant limitation to some of the scales is that they measure a lack of mindfulness (in other words, mindlessness), rather than mindfulness directly. For example, an item on the FFMQ is “I find it difficult to stay focused on what is happening in the present moment” (Baer et al., 2006), from which the absence of mindlessness is inferred to suggest the presence of mindfulness, something that has

been criticised, considering mindfulness and mindlessness are not necessarily the same construct (Chiesa, 2012). Indeed, this was supported in a study finding that trait mindfulness and trait mindlessness only share around 6% of their variance, demonstrating that they are distinct constructs (Richie & Bryant, 2012). Furthermore, the differences in conceptualisation and operationalisation of mindfulness across studies has been criticised, where it is said that a lack of knowledge of the original understanding of mindfulness has allowed researchers to develop their own definitions, creating conceptual discrepancies in the research (Chambers et al., 2009). Despite their limitations, however, the scales used to measure mindfulness have been useful in demonstrating the effects of mindfulness-based interventions.

#### *Mindfulness-based interventions*

The use of mindfulness as a clinical intervention in psychology stemmed from the work of Kabat-Zinn who developed the mindfulness-based intervention now known as Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1982). MBSR is a group-based intervention which involves mindfulness meditation practice to help people relate to their distress, from either physical or psychological conditions, in an accepting and non-judgmental manner (Kabat-Zinn, 1982). Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams and Teasdale, 2002) is a further intervention using techniques to induce and improve mindfulness, adapted from MBSR. MBCT draws on both mindfulness training and cognitive therapy to help individuals adapt their awareness of and relationship to negative thoughts that might maintain distress, primarily in depression (Segal et al., 2002).

### *Research in adults*

Research into the use of mindfulness-based interventions has begun to develop a strong evidence base, however the majority of the research has focused on adult populations. High quality research from randomised controlled trials (RCTs) has demonstrated that mindfulness-based interventions have a significant impact on psychological well-being in adults (Keng, Smoski, & Robins, 2011). Several trials conducted with both clinical and non-clinical populations have found that MBSR interventions lead to reductions in anxiety, depression, anger, and psychological distress (Anderson, Lau, Segal, & Bishop, 2007; Branstrom, Kvillemo, Brandberg, & Mosokowitz, 2010; Grossman et al., 2010) and improvements in mindfulness, quality of life, life satisfaction, and well-being (Anderson et al., 2007; Shapiro, Astin, Bishop & Cordova, 2005). RCTs evaluating the impact of MBCT have continued to mirror these results, finding that MBCT reduces episodes of, and relapses, in depression (Chiesa & Serreti, 2010; Godfrin & van Heeringen, 2010). While RCTs provide data considered high quality as they minimise biases and control for interfering factors, there are some limitations to this body of research. Not all the trials had an active treatment comparison, meaning it cannot be concluded that the mindfulness-based intervention was more effective than other interventions. Furthermore, the sole use of self-reported measures of mindfulness are limited for several reasons, including social desirability, where participants might be willing to demonstrate an improvement or consider themselves more mindful, having participated in a mindfulness-based intervention.

### *Research in adolescents*

Research into the effects of mindfulness-based interventions in children and adolescents is much more limited (Metz et al., 2013; Weare, 2013). In the few studies that have explored the effect of mindfulness interventions with adolescents, however, positive effects have been demonstrated, reflecting the adult evidence-base. It has been shown that interventions to enhance mindfulness in adolescents can improve well-being and emotion- and self-regulation, while reducing levels of depression, anxiety, and aggressive and oppositional behaviour (Heppner et al., 2008; Huppert & Johnson, 2010; Kuyken et al., 2013; Semple et al., 2010; Weare, 2013; Zoogman, Goldberg, Hoyt, & Miller, 2015), and there is clear evidence that mindfulness-based interventions are feasible with adolescents (Burke, 2010).

#### *a) Interventions with adolescents in the community*

The majority of the research on mindfulness-based interventions with adolescents has been conducted in the community, in schools (Zoogman et al., 2015). Liehr and Diaz (2010), for example, explored the effects of a brief, intense mindfulness-based intervention, where participants practiced mindfulness techniques every day for two weeks, in an American summer school. The findings showed that the intervention was effective at improving symptoms of depression, but not anxiety, as compared to a general health education class. While this study benefits from having an active control group, the sample size was small (n=18) and there was no follow up, meaning the long-term benefits are unknown. Furthermore, the brief nature of the intervention differs from the standardised (usually 8-week) mindfulness-based interventions, which may propose difficulties in comparing results, and the intensity of the intervention may be difficult to implement in other settings.

Metz et al. (2013) also reported positive effects of a mindfulness-based intervention delivered in a mainstream high-school. This study implemented a specific mindfulness-based training programme “Learning to BREATHE”, which is designed to develop emotion regulation and attentional skills in adolescents, and found that it led to self-reported reductions in stress and psychosomatic symptoms, such as difficulties concentrating, worry, fatigue and headaches, as well as improved emotion regulation skills, including emotional awareness and access to regulation strategies in comparison to a control group (Metz et al., 2013).

The findings have been somewhat inconsistent however. In an earlier study conducted with 155 adolescents attending a private school, Huppert and Johnson (2010) found no significant differences between adolescents randomised to a mindfulness-based training programme as compared to a ‘treatment as usual’ group: regular education lessons. Additionally, scores on a measure of mindfulness decreased following this mindfulness intervention, demonstrating a negative effect. It is possible, however, that the brief duration of the sessions (40 minutes per week) in this programme was not enough exposure to the mindfulness techniques to result in a significant difference. Given this was conducted in a community sample, levels of symptoms may have been low to begin with, therefore may have limited the potential of an intervention showing an effect.

Despite this, however, recent high quality studies have continued to report the efficacy of mindfulness-based interventions conducted in schools. Raes et al. (2014) published the first RCT of an 8-week school-based programme which integrated MBSR and MBCT. The findings revealed significant greater reductions in symptoms of depression in the intervention group compared to the control group at post-

treatment, and at a 6-month follow up. While RCTs can control for extraneous factors and variables, and this RCT in particular benefited from a large sample size, this study was limited by the lack of an active comparison group. An active treatment comparison group is considered particularly important in studies involving interventions such as mindfulness, where there is a significant amount of participant participation, meaning the risk of a placebo effect is high; it has also been argued whether mindfulness practice can intentionally create a placebo effect (Bishop, 2011).

*b) Interventions with adolescents with SEBD*

Although school-based interventions have been the focus of the majority of the literature, there have been a small number of studies investigating the effects of mindfulness-based training in adolescents with psychological diagnoses or SEBD. Biegel, Brown, Shapiro and Schubert (2009) conducted an RCT with adolescents attending a psychiatric outpatient clinic, and compared an MBSR treatment programme to a wait-list control group. The intervention demonstrated moderate to large effect sizes, with significant decreases in symptoms of depression and anxiety and increases in self-esteem following the intervention. More recently, these findings were replicated in a study exploring the effects of a 5-week mindfulness-based intervention in adolescents attending a mental health clinic. Following the intervention, there were significant reductions in psychological distress, psychological symptoms, and behavioural problems, and significant increases in mindfulness and self-esteem, as rated on both self- and parent-reported measures (Tan & Martin, 2012). While this study controlled for the limitations of only using self-reported measures, by including parental reports also, it was limited by a lack of any form of control group, and the small sample size (n=9).

The positive effects of mindfulness interventions have continued to be demonstrated however, with reduced anxiety and depressive symptoms found in adolescents with attention deficit hyperactivity disorder (van der Oord, Bogels, & Peijnenburg, 2012; Zylowska et al., 2008), following mindfulness-based interventions. However, again these studies have all been limited by very small sample sizes of only 3 to 14 participants, from which it is difficult to draw any firm conclusions.

A recent meta-analysis looking at the overall effects of mindfulness-based interventions in adolescents supported their efficacy, finding that there is an overall significant effect for mindfulness-based interventions on a number of variables, although this was found to be small (Zoogman et al., 2015). Of interest, this review found that in comparison to interventions conducted in the community, where the effect size for mindfulness-based interventions was small, the effect size for interventions conducted in clinical populations was moderate (Zoogman et al., 2015), demonstrating that mindfulness-based interventions might be more effective for those who have existing diagnoses or SEBD.

Again, recent reviews of this literature have highlighted the relatively weak study designs (for example, small sample sizes, lack of controlled designs, lack of randomisation), measures and absence of follow-up data in this evidence base (Frank et al., 2013; Harnett & Dawe, 2012; Zoogman et al., 2015), therefore future research is needed to address this. Future research is said to be particularly necessary in community samples, where the research is especially prone to these methodological limitations (for example, lack of active control groups and non-randomised designs) (Raes et al., 2014).

*c) Interventions with adolescents with conduct problems*

Considering the role of emotion regulation in conduct problems and the effect mindfulness-based interventions can have on emotion regulation, mindfulness is likely to have a positive effect in those with conduct problems. However, there is very limited research demonstrating the effects of mindfulness-based interventions specifically in adolescents with conduct problems, despite the growing evidence base for mindfulness interventions with children and adolescents more generally.

In a very small study of three adolescents with conduct disorder, at risk of expulsion from school due to aggressive behaviour, Singh et al. (2007) explored the effects of a mindfulness-based training programme. The participants met with a therapist individually three times a week for four weeks for training which involved learning a specific mindfulness technique “meditation of the soles of the feet”. The results showed that during the 25 weeks following the training sessions, there were substantial reductions in aggressive behaviour and bullying, as reported by teachers. Although this supports that mindfulness can have positive effects on behavioural difficulties in those with conduct disorder, this study is obviously limited by the very small sample size, lack of a control group, and that the adolescents were referred due to being at risk of expulsion, which may have provided a strong incentive to change their behaviours (Singh et al., 2007).

A further evaluation of mindfulness training with adolescents with conduct problems supports these findings. Bogels et al. (2008) evaluated the effects of an 8-week MCBT programme in 14 adolescents with externalising disorders. Of these participants, eight displayed conduct problems: two had a diagnosis of conduct disorder and six had oppositional defiant disorder. The results showed that following



the training programme the adolescents reported improvements in internalising and externalising complaints, attention problems, and happiness, and performed better on a test of sustained attention, supporting the positive effects mindfulness interventions can have with adolescents with conduct problems. Parent-rated measures echoed these results. However, again this study is limited by a small sample size, and a high proportion of drop-outs: 50% of those with oppositional defiant disorder who initially participated dropped out, meaning the highest number of dropouts in this study were those that had conduct problems, limiting these findings.

Research looking specifically at the effects of mindfulness-based interventions in those with varying levels of callous-unemotional traits, and the interaction between mindfulness and levels of callous-unemotional traits is even more limited. One study evaluated a yoga meditation programme conducted with 25 adolescents with conduct problems and found greater effects of the programme on emotional symptoms, including symptoms of depression and anxiety, in those with low levels of callous-unemotional traits compared to high levels, although these effects were not significant (McCabe, 2009). This study, however, was again limited by the small sample size and low statistical power, which, if increased, may have led to significant findings. Furthermore, the study used self-reported measures to assess depression, anxiety and callous-unemotional traits, which may not have provided an accurate reflection, given the defensiveness in adolescents with conduct problems (McCabe, 2009) and the likelihood of social desirability here.

This is in line, however, with biopsychosocial theories of conduct problems and levels of callous-unemotional traits, and evidence suggesting that emotion processing and regulation difficulties differ between those with low versus high levels of callous-

unemotional traits (Frick et al., 2003). As described earlier, adolescents with conduct problems and high levels of callous-unemotional traits tend to be hypo-responsive to emotional cues, while those with low levels of callous-unemotional traits tend to be hyper-responsive (Sebastian et al., 2012; Sharp et al., 2006). This theoretically supports that mindfulness would be most relevant to those with low levels of callous-unemotional traits, whose conduct problems stem more so from emotional reactivity and poor emotion regulation, compared to those with high levels of callous-unemotional traits, whose behaviour is more strongly influenced by callous traits.

Given that mindfulness interventions have been shown to have effects across a range of clinical disorders (Zoogman et al., 2015), it is said to be likely that the mechanisms underlying mindfulness and mindfulness-based interventions are shared across these disorders (Teasdale, Segal, & Williams, 2003). These underlying mechanisms and the processes through which mindfulness affects psychological well-being require further investigation.

### Theories of Mindfulness

Considering the number of definitions and conceptualisations of mindfulness, it is not surprising that scientifically defining the construct of mindfulness is said to be challenging (Arch, & Craske, 2006). There are a number of theories of mindfulness (for example, Bishop et al., 2004; Brown et al., 2007; Shapiro et al., 2006) which propose ideas as to how mindfulness is effective, however the Interacting Cognitive Subsystems (ICS) theory (Barnard & Teasdale, 1991) provides an overall theory of cognitive-affective interaction which can be applied to mindfulness, and is helpful in understanding it. This theory proposes that nine subsystems or modes interact to receive, process and experience new information cognitively and emotionally. Each

subsystem within the ICS is responsible for specific cognitive information, and has an objective and subjective level of experience. Of particular relevance to mindfulness, it proposes a mode of 'being', which emphasises accepting and allowing what is (Bernard & Teasdale, 1991). Mindfulness techniques which bring awareness to the body are said to directly relate to certain subsystems, for example, the implicational subsystem which is responsible for the production of emotion (Turner, 2012). While this is helpful as a wider theoretical account of mindfulness, understanding the specific underlying mechanisms of mindfulness is also necessary. Several components have been proposed to explain the process by which mindfulness works; these are discussed below.

#### *Mechanisms underlying Mindfulness*

Despite the growing literature on the correlations between mindfulness and psychological well-being and the effects of mindfulness interventions, there is surprisingly little research on how mindfulness actually works and the mechanisms underlying it. In a recent review, Holzel et al. (2011) outlined the following components as mechanisms of mindfulness: attention, body awareness, emotion regulation and self-perspective. However, self-compassion, ruminations, experiential avoidance, and cognitive reactivity have also been proposed as underlying mechanisms of mindfulness (Chiesa et al., 2014). Attention and emotion regulation are two of the most regularly cited mechanisms of mindfulness (Arch & Craske, 2006; Holzel et al., 2011; Shapiro et al., 2006), therefore the following section will outline the research proposing attention and emotion regulation as underlying mechanisms of mindfulness.

### *Attention as an underlying mechanism of mindfulness*

Much of the research into mindfulness has proposed a significant underlying role of attention. By definition, attention is at the core of mindfulness practice, with the fundamental concept of mindfulness being the ability to pay deliberate attention to one's internal and external experience and the present moment (Kabat-Zinn, 1994; Shapiro et al., 2006). Indeed mindfulness involves training attention to shift from past or future events to the present moment, and theories into the underlying mechanisms of mindfulness propose the role of attention. Shapiro et al. (2006) proposed that attention (along with intention and attitude) was a key component of mindfulness, and accounted for a large variance in the effects seen in mindfulness.

Many studies have found support for the underlying role of attention, finding that mindfulness-based interventions have positive effects on attention (Bogels et al., 2008; Jha, Krompinger, & Baime, 2007; Zeidan et al., 2010). Specifically, mindfulness was found to improve attention and attention-related behavioural responses, by enhancing specific subcomponents of attention, including alerting, orienting and conflict monitoring (Jha et al., 2007), demonstrating the relationship between mindfulness and attention. Studies have also demonstrated that participants who are experienced mindfulness meditators perform better on tasks measuring attention compared to those without experiences practicing mindfulness (Jha et al., 2007). Improvements in attentional abilities have also been found following mindfulness interventions (Wenk-Sormaz, 2005; Zeidan et al., 2010), although these results are less consistent, with some studies finding no effect of mindfulness interventions on attention (Anderson et al., 2007).

Nevertheless, results from neuroimaging studies continue to support the relationship between attention and mindfulness. Holzel et al. (2007) found greater activation in brain areas related to attention in experienced mindfulness meditators as compared to matched controls, which was said to indicate that mindfulness meditation has an effect on attention. Causality, however, cannot be established with fMRI and it is possible that participants were achieving a mindful state using attentional mechanisms. More recently, these findings have been supported in a neuroimaging study which found increased brain activity in areas associated with attention following mindfulness practice (Gard et al., 2012). Of particular interest, mindfulness-based interventions were found to improve selective attention significantly more than comparison groups in the trial (non-mindfulness stress reduction and a non-active control group), demonstrating that mindfulness is uniquely related to attention (Jensen, Vangkilde, Frokjaer, & Hasselbalch, 2012), and further supporting the role of attention as a mechanism underlying mindfulness interventions.

#### *Emotion regulation as an underlying mechanism of mindfulness*

As demonstrated, there is a wealth of evidence that mindfulness is related to emotion regulation. Studies have shown that trait mindfulness correlates positively with emotion regulation (Bullis et al., 2014; Coffey et al., 2010; Lyvers et al., 2014). Neuroimaging studies again provide support for the relationship between mindfulness and emotion regulation, where results from fMRI studies have shown increased activity in areas associated with emotion regulation during mindfulness meditation (Holzel et al., 2007), following MBSR programmes (Farb et al., 2007; Goldin & Gross, 2010) and associated with self-reported trait mindfulness (Creswell, Way, Eisenberger, & Lieberman, 2007).

Research has now begun to explore the relationship between emotion regulation and mindfulness more thoroughly and has demonstrated that emotion regulation plays a mediating role between the effects of mindfulness on psychological symptoms. For example, Desrosiers et al. (2013) found that the emotion regulation strategies of rumination, reappraisal and worry significantly mediated the association between trait mindfulness and symptoms of anxiety and depression. In a following study by the same authors (Desrosiers et al., 2014), it was described that dual process models of cognition can help to explain this process. Information is processed in automatic ways initially, before advancing to more controlled forms of thinking. It is therefore proposed that an ability to be mindful gives way for more controlled emotion regulation process that follow (Desrosiers et al., 2014), thus explaining how emotion regulation might mediate the relationship between mindfulness and psychological symptoms.

Further studies exploring this relationship have demonstrated that emotion regulation was the strongest mediator in the relationship between mindfulness and engaging in problematic and risk-taking behaviour in young adults (Feldman, Greeson, Renna, & Robbins-Monteith, 2011) and that the emotion regulation strategy of rumination partially mediated a causal relationship between mindfulness and anger, hostility and verbal aggression (Borders, Earleywine, & Jajodia, 2010). However, as with most of the literature in this area, these studies are limited by the sole use of self-reported measures, the limitations of which have been highlighted previously.

Despite this growing research on the relationship between mindfulness and emotion regulation, and the findings that emotion regulation mediates the relationship between mindfulness and well-being, there is still relatively little known about the

mechanisms, extent and processes by which mindfulness affects emotion regulation (Desrosiers et al., 2013). Hill and Updegraff (2012) explored this by looking at the relationship between mindfulness and emotion regulation and the roles of emotion differentiation and emotion lability, in an undergraduate population. Their mediational models indicated that the relationship between mindfulness and emotion lability was mediated by emotion differentiation, while emotion regulation mediated the relationship between mindfulness and both emotion lability and emotion differentiation, demonstrating the complex processes involved in the relationship between mindfulness and emotion regulation. However, studies are still yet to further explore the mediators and mechanisms between the relationship between mindfulness and emotion regulation. Research investigating the relationship between mindfulness and emotion regulation in children and adolescents, and the role of any mediating constructs also remains very limited and inconsistent (Semple et al., 2010).

*Attention as a mediator between mindfulness and emotion regulation*

While it is likely that trait mindfulness is comprised of several underlying mechanisms (Holzel et al., 2011), attentional control is the most likely mechanism underlying the association between mindfulness and emotion regulation. Given the fundamental role attention plays in both mindfulness and emotion regulation, it is possible that it would mediate the relationship between the two constructs. There has been no research directly exploring this, however it is theoretically supported. In exploring the relationship between mindfulness and emotion regulation, Desrosiers et al. (2014) propose that an initial orienting of attention takes place before more detailed emotion regulation strategies or higher-level thinking can occur, in line with dual-process models of cognition (Chaiken, & Trope, 1999). This supports the

possibility that attention could mediate the relationship between mindfulness and emotion regulation, in other words, that attention is the ‘active ingredient’ by which mindfulness and emotion regulation are related and mindfulness depends on the process of attention, as depicted in Figure 3.

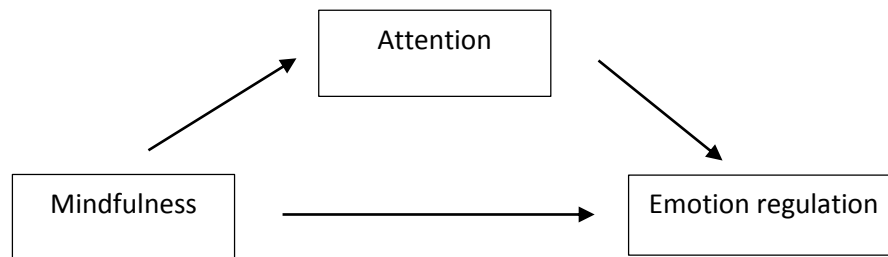


Figure 3: Attention as a mediator in the relationship between mindfulness and emotion regulation.

### **1.6 Rationale for the present study**

As presented in this chapter, emotion regulation plays a significant role in SEBD in adolescents. Given the rise of SEBD in adolescents and the impact of these difficulties on family life, social functioning and education (Gutman & Vorhaus, 2012; Renzaho et al., 2013), it is important to develop and explore effective interventions to support this population.

While mindfulness-based interventions have begun to develop a good evidence base for their use in psychological difficulties in adults, there is very limited research into mindfulness and the effects of mindfulness-based interventions in adolescents with SEBD, and even more limited for those specifically with conduct problems, who are more likely to have emotion regulation difficulties as well as a poor understanding and expression of emotion (Beauchaine et al., 2007). Despite the existing literature



demonstrating that mindfulness-based interventions with this population have positive effects on emotion regulation, attention, behavioural difficulties and emotional symptoms (Bogels et al., 2008; Kuyken et al., 2013; Singh et al., 2007), there has not been any research exploring the relationships between these constructs further in adolescents with SEBD.

Adolescence in general is said to be an “opportune time to explore processes and correlates of emotion regulation” (Silk et al., 2003 p. 1869), as it is a time which involves new and intense emotional experiences and when the cognitive systems underlying emotion regulation are developing. Furthermore, the prevalence of psychopathology and SEBD increase significantly during adolescence (Silk et al., 2003). Given a period of increased risk of SEBD and that little research has been conducted with adolescent populations (Neumann et al., 2010), it is important to explore emotion regulation and potential ways to improve it in adolescents more thoroughly.

More specifically, adolescents with conduct problems have been found to have particular difficulties with emotion regulation (Frick & Morris, 2004), and the varying levels of callous-unemotional traits that exist within this population are likely to interact with emotion regulation abilities, as well as the effects of interventions such as mindfulness. There has been no research exploring this further in terms of the relationships between emotion regulation, attention and mindfulness in those with varying levels of callous-unemotional traits, again portraying an under-researched area that would be important to explore.

Some research has explored some potential underlying mechanisms and mediators of the relationship between mindfulness and emotion regulation in adults, for example,

Hill and Updegraff (2012) looked at the mediating roles of emotion differentiation and emotion lability. No previous study, however, has explored the mediating role of attention in this relationship nor the underlying mechanisms of mindfulness and any mediating factors in adolescents. This would be helpful to further explore in order to determine the constructs that interventions for this population could target.

The current literature that does exist which separately explores the constructs of emotion regulation, attention and mindfulness in adolescents with SEBD and/or conduct problems tends to be limited by the sole use of self-reported questionnaires to measure these constructs (e.g. Silk et al., 2003).

### **1.7 The Present Study**

The present study aimed to address these gaps in the existing literature by exploring the relationships between emotion regulation, attention and mindfulness in adolescents with SEBD and a control group. The study looked in particular at the mediating role of attention in the relationship between mindfulness and emotion regulation in these two populations. Focusing specifically on those with conduct problems and varying levels of callous-unemotional traits, the study also compared the relationships between these constructs in adolescents with high and low levels of callous-unemotional traits.

Given that the mechanisms by which mindfulness-based interventions are effective are unclear (Raes et al., 2014), it is important for research to explore this for future interventions to specifically target these mechanisms. Exploring the relationships between emotion regulation, attention and mindfulness in adolescents with and without SEBD, and more specifically, conduct problems and varying levels of

callous-unemotional traits, can help clarify the mechanisms underlying mindfulness and inform future mindfulness-based interventions with these populations.

The participants in this study were adolescents aged 11-16 attending pupil referral units and a control group of adolescents the same age attending mainstream schools.

The study used a range of methods to measure each construct more completely.

Participants completed a range of self-report questionnaires measuring emotion regulation, attention and trait mindfulness, as well as levels of SEBD. They also completed computerised cognitive tasks including an emotional n-back task and a flanker task to objectively measure implicit emotion regulation and selective attention.

Other-informant measures from teachers were also collected to assess levels of SEBD, conduct problems, and callous-unemotional traits. The use of both self- and other-reported measures, as well as computerised tasks in this study helped to overcome the limitations of some of the existing literature which only used self-report measures.

The computerised tasks also provided additional specific information on distractibility by emotion, which can reflect hypervigilance to emotion as well as poor attentional engagement, such processes that are not well-captured by self-report measures.

### Hypotheses

- 1) It was hypothesised that positive correlations between emotion regulation, attention and mindfulness in adolescents with SEBD and in controls would be found.
- 2) Considering the fundamental role of attention in both emotion regulation and mindfulness, it was hypothesised that the relationship between mindfulness and emotion regulation would be mediated by attention.

3) Finally, considering these relationships across those with varying levels of callous-unemotional traits, it was hypothesised that there would be stronger relationships between these constructs in adolescents with low levels of callous-unemotional traits compared to those with high levels.

## **Chapter 2: Method**

### **2.1 Participants**

#### **Sample**

Participants were opportunistically sampled from two pupil referral units (PRUs) and two mainstream secondary schools in London and Sussex who agreed to take part in a study looking at the relationships between emotion regulation, attention and mindfulness in adolescents. The total sample consisted of 16 females and 45 males (n=61) ranging from 11 to 16 years (mean age = 14.21, SD = 1.37). The SEBD sample recruited from PRUs consisted of 7 females and 24 males (n=31) with a mean age of 14.22 (SD = 1.34). The control group consisted of 9 females and 21 males (n=30) with a mean age of 14.19 (SD = 1.37).

#### **Inclusion Criteria**

The SEBD group were recruited from PRUs. Pupils aged 11-16 years who were available to take part and did not fulfil any of the exclusion criteria below were selected to participate. The control group were recruited from mainstream secondary schools, where participants were selected to match the SEBD group on age and gender as far as possible.

#### **Exclusion Criteria**

Participants were excluded from the study if they were illiterate or unable to understand English, as it was judged these individuals would be unable to complete the test battery. Participants with a diagnosis of Autism Spectrum Disorder were also excluded from the study given that the nature of their social difficulties differ qualitatively from those with other SEBD such as conduct problems.

### Power Analysis

A power analysis was conducted a priori to estimate the required sample size for this study using data from Hill and Updegraff (2012), who explored the relationships between mindfulness and emotion regulation in young adults. Hill and Updegraff (2012) used similar measures to those employed in the current study: they used the Difficulties in Emotion Regulation Scale (DERS) as a measure of emotion regulation, as used in the current study; they also used the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006), an adult measure of mindfulness developed by the same authors of the Child and Adolescent Mindfulness Measure (CAMM) used in the current study. Similar analyses to those planned to be used in the current study were also used, including correlations between mindfulness and emotion regulation, as well as mediation analysis to explore factors mediating this relationship. Hill and Updegraff (2012) reported a large effect size ( $r=-0.58$ ) for the correlation between self-reported mindfulness and emotion regulation difficulties in their study. A power analysis based on this effect size estimated that 28 participants in each group would be required in order to determine an effect at a standard alpha level of 0.05 with 80% power (Cohen, 1992).

### Ethical Approval

Ethical approval for this project was gained from the Royal Holloway, University of London Ethics Committee (Appendix 1).

## **2.2 Measures**

### **Design**

This study employed a cross-sectional, correlational design, which looked at relationships between the different variables (emotion regulation, attention, and mindfulness) across two populations: adolescents with SEBD and a control group.

### **Experimental tasks**

Participants completed a computerised battery consisting of cognitive tasks and self-report questionnaires. All measures were programmed using Delosis Psytools Software (<http://www.delosis.com/home/html>) and presented on laptops. Participants sat approximately 50cm from the screen for all tasks.

#### *i. Emotional n-back*

An emotional n-back task (adapted from Ladouceur et al., 2009) was used to measure emotion regulation. Specifically, this measured implicit emotion regulation performance, which was operationalised as the extent to which emotional information distracted attention from a central cognitive task. This followed a 2 (task: 0-back, 2-back) x 4 (distractor: no distractor, fearful faces, happy faces, calm faces) blocked factorial design. Participants were shown either single digit numbers only, or, in the distractor conditions, two identical emotional or calm faces flanking the numbers on each side. Participants were told to ignore the faces throughout the task.

In the 0-back task participants were asked to indicate whether the number which flashed up on the screen was a zero or another number. They were told to press the left button (Z) for zero and the right button (M) for any other numbers. This task was a non-working memory control condition.

In the 2-back task, participants indicated whether the number which flashed up on the screen was the same as the number presented two trials before. As before, the left button was pressed if the number was a repeat of the number two trials before, and the right button was pressed for anything else.

The digits were presented in the centre of the computer screen in black 80pt Bitstream Vera Sans font. The faces which flanked the digits were taken from the NimStim set <http://www.macbrain.org/resources.htm>. They consisted of six male faces and six female faces for each emotion, which were presented in greyscale, with the eyes level with the digits presented.

The central digit and flanking faces were presented to participants simultaneously for 500ms initially. The digit then disappeared and was replaced with a fixation cross (+) for the remainder of the trial. The remainder of the trial was between one and three seconds (every 200ms duration from 1000 to 3000ms represented equally, plus an extra 2000ms duration, adding up to 12 possible delays). These were randomly presented across the 12 trials for each block. Figure 4 shows the fixation cue, and numbers flanked by emotional faces as participants saw.

The task consisted of 16 blocks (two of each condition). Participants completed two sets of four 0-back conditions and four 2-back conditions, both in random order, with a break halfway through. Each block involved 12 trials, with three targets (0-back or 2-back targets) per block. Matlab was used to generate random sequences of the position of the targets, which remained the same for all participants.

Participants' reaction times and error rates were recorded based on their key press responses. These could be recorded either during the presentation of the digit or



during the fixation period following it. Only the participant's first key press response was taken.

Participants first completed 12 0-back and 12 2-back practice trials with stimuli not seen in the main experiment. If participants made more than one error on either practice block they repeated that block. Participants were given up to three attempts on the practice trial before moving onto the main experiment. A maximum of three attempts was set to avoid frustration at a longer practice run.

Scoring for this task was based on accuracy of response, expressed as d-prime scores ( $d'$ ) <http://www.linguistics.ucla.edu/faciliti/facilities/statistics/dprime.htm>. To calculate  $d'$ , both the 'hit rate' (correct n-back targets divided by the total number of target trials) and 'false alarm rate' (non-target trials incorrectly identified as n-back targets divided by the total number of non-target trials) were calculated. Separate d-prime scores were then calculated separately for each emotion condition for each participant.

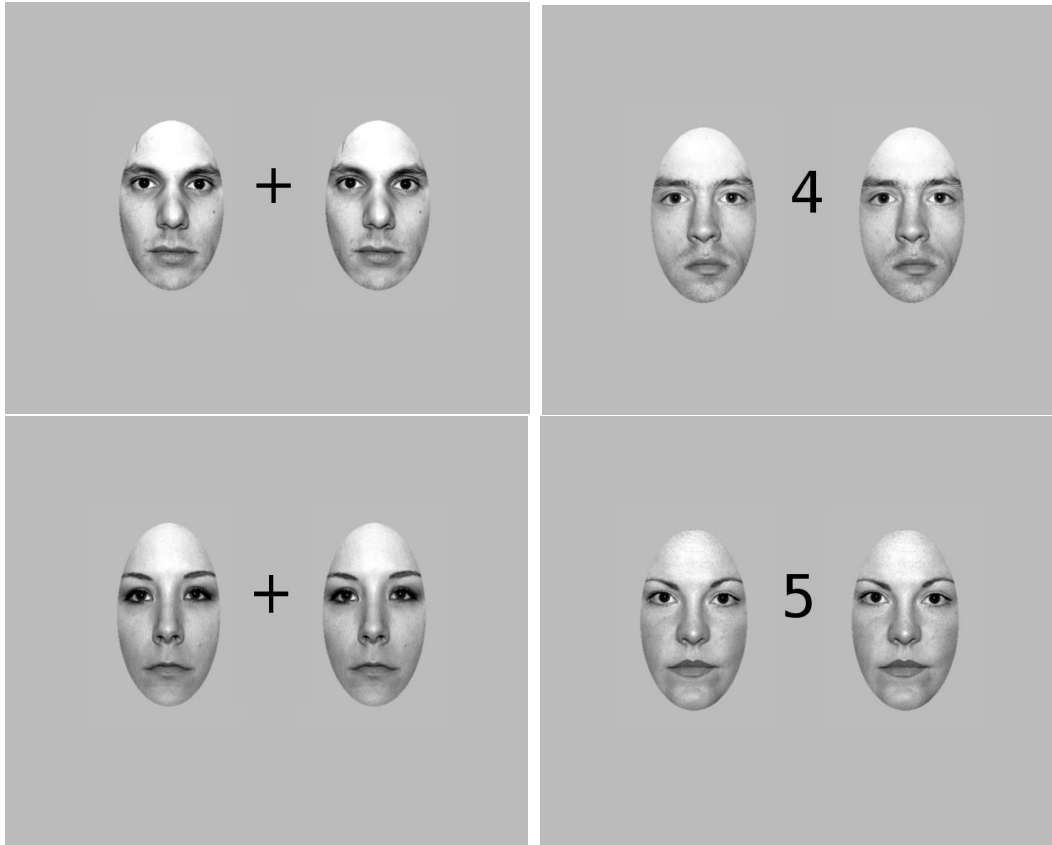


Figure 4: Emotional n-back stimuli showing the fixation cross and numbers flanked by emotional faces.

ii. Flanker Task

Attention was measured in this study by a computerised modified flanker task (Eriksen & Eriksen, 1974), which measures selective attention. In this variant of the task (developed by Weintraub et al., 2014), participants were asked to indicate which direction a central arrow, flanked by either congruently or incongruently facing arrows, was pointing, which was cued by either a congruent (correctly predicting the targets location) or incongruent cue.

This task followed a 2 x 2 design, with targets having a congruent target flanker 50% of the time and an incongruent target flanker 50% of the time, and a cue correctly predicting the correct location of the arrow 80% of the time. Participants completed

two sessions of the task, each consisting of 120 events, which included 48 trials with a congruent target/congruent cue, 48 trials with an incongruent target/congruent cue, 12 trials with a congruent target/incongruent cue, and 12 trials with an incongruent target/incongruent cue. The direction of the arrows was counterbalanced across the trials.

Each trial lasted an average of 2500ms. Participants were shown a fixation cross (+) for the first 400ms of the trial, followed by the star cue (\*) presented for 150ms. They were then shown the fixation cross only for 400ms, followed by the fixation cross and the target for 1300ms, and finally a variable 50 to 450ms of fixation. Participants were able to respond from 100ms after the target was presented until the end of the trial (including during the variable 50-450ms fixation period).

Figures 5a-5d show the sequence of the trial: fixation cross, star cue (either congruently or incongruently predicting the location of the target), and the target (either congruently or incongruently flanked) for each condition (congruent target/congruent cue, incongruent target/congruent cue, congruent target/incongruent cue, and incongruent target/incongruent cue).

The trial sequences were fixed for each session and remained the same across all participants.

Participants completed a practice run prior to the main experiment. The practice was conducted until participants got 8/10 correct per practice block, up to a maximum of 3 practice blocks. These used the arrays generated for the main experiment to generate trial order, however the arrow direction and cue location were not fully counterbalanced given the limited number of trials in the practice. For the practice

trials, the arrow direction and cue location were randomised, involving 10 trials in each of the 3 practice blocks.

Scoring for this task was based on accuracy and reaction time.

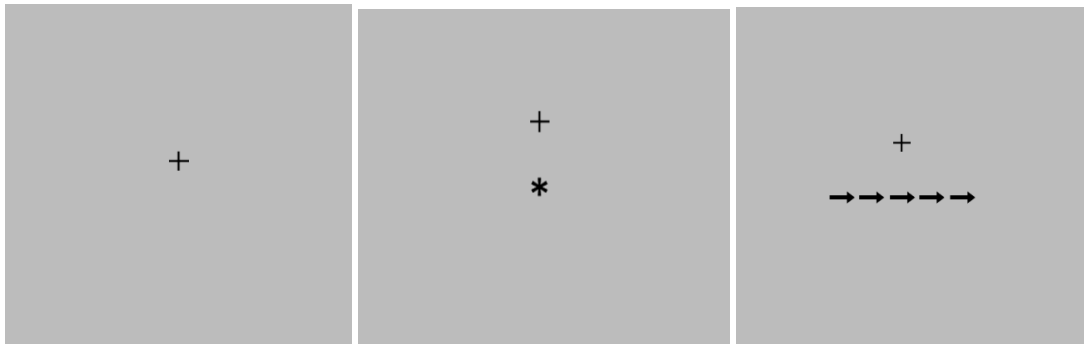


Figure 5a : Flanker task trial sequence for congruent cue and congruent target condition.

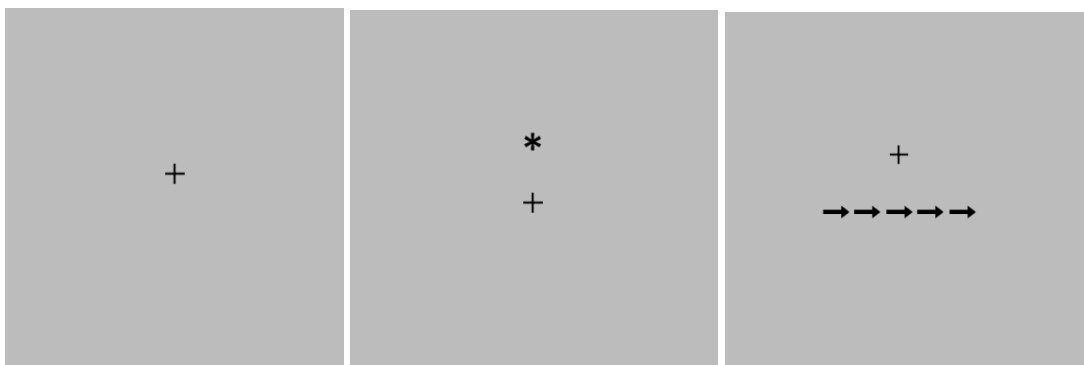


Figure 5b: Flanker task trial sequence for incongruent cue and congruent target condition.

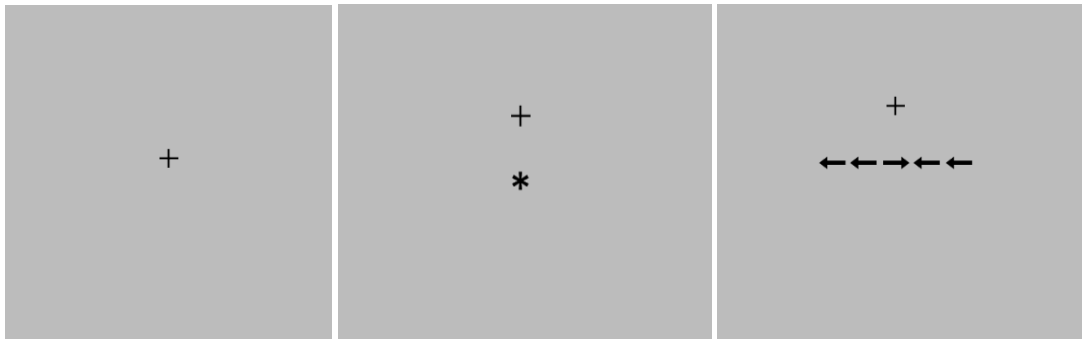


Figure 5c: Flanker task trial sequence for congruent cue and incongruent target condition.

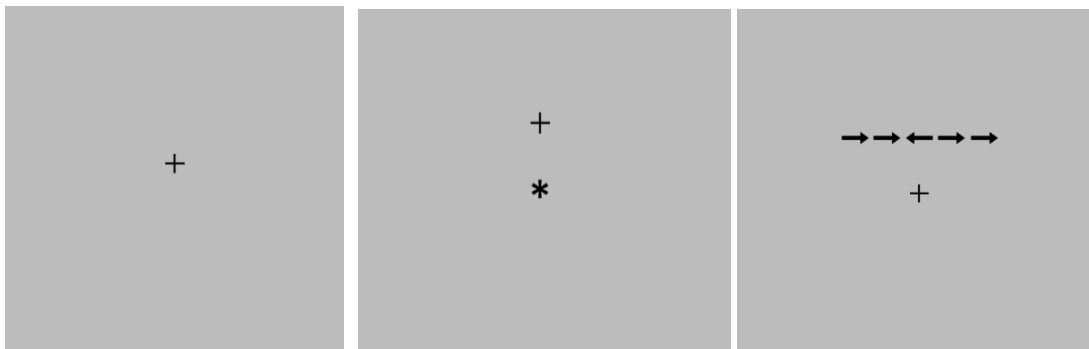


Figure 5d: Flanker task trial sequence for incongruent cue and incongruent target condition.

### Questionnaire Measures

#### *Self-report questionnaires*

The following standardised questionnaire measures were developed into computerised versions and administered together with the tasks above as a battery.

##### *i. Demographics*

Basic standard demographic data which included gender, age, number of siblings, language spoken at home, length of time lived in UK, ethnicity, and postcode (as a proxy measure of SES), was collected from participants for group matching purposes.

ii. Difficulties in Emotion Regulation Scale (DERS)

The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004; Appendix 2) was used as a self-report measure of emotion regulation, in addition to the cognitive task, to identify whether effects on emotion regulation are identified in both computer tasks and self-report measures.

The DERS is a 36-item scale assessing clinical difficulties in emotion regulation. Respondents are required to indicate how often the 36 statements, which describe feelings and behaviours in response to emotions (e.g. “When I’m upset, I become angry with myself for feeling that way”), apply to them, on a 5-point Likert scale (1= almost never, 2 = sometimes, 3= about half the time, 4= most of the time, 5= almost always).

A total score as well as scores on six sub-scales are calculated. The six sub-scales include: 1. Non-acceptance of emotional responses, 2. Difficulties in engaging in goal directed behaviour, 3. Impulse control difficulties, 4. Lack of emotional awareness, 5. Limited access to emotion regulation strategies and 6. Lack of emotional clarity. A high score indicates greater difficulties in emotional regulation.

This scale has been validated for use with adolescents (Neumann et al., 2010) and has demonstrated good reliability and validity, with a Cronbach’s alpha of 0.92. Neumann et al. (2010) found the DERS to have good internal consistency and found the different dimensions of emotion regulation difficulties demonstrated statistically significant and specific associations with both externalising and internalising problems, supporting the scales’ construct validity and supporting the utility and distinctiveness of the subscales.

iii. *The Emotion Regulation Questionnaire for Children and Adolescents*  
*(ERQ-CA)*

The Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA; Gullone & Taffe, 2012; Appendix 3) is a brief 10 item self-report questionnaire of emotion regulation adapted from the adult Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). The ERQ-CA identifies the use of two specific emotion regulation strategies: cognitive reappraisal and expressive suppression, on a 5-point Likert scale (0= strongly disagree, 1= disagree, 3= half and half, 4= agree, 5= strongly agree). A higher mean score on either subscale (reappraisal or suppression) indicates that emotion regulation strategy is used more. The ERQ-CA has demonstrated good internal consistency and good construct and convergent validity, comparable to the adult version. Gullone and Taffe (2012) found the measure to have Cronbach's alpha coefficients of 0.83 for the cognitive reappraisal scale and 0.75 for the executive suppression scale, demonstrating its reliability.

Both the DERS and the ERQ were considered helpful measures to use in addition to the emotional n-back task as they each measure unique elements of emotion regulation which may relate differently to attention and mindfulness. The DERS provides an overall measure of general difficulties in emotion regulation, while the ERQ provides information of two specific emotion regulation strategies: suppression and cognitive reappraisal, which could be uniquely important in the relationships with attention and mindfulness. The emotional n-back task provides additional information on cognitive processes that are not well-captured by self-report measures as described earlier. Given the strengths and limitations of different methods, the construct of emotion regulation can be most thoroughly captured by combining these different

methods. This also overcomes the limitations of previous research, which has generally used only self-report measures.

iv. *Child and Adolescent Mindfulness Measure (CAMM)*

The Child and Adolescent Mindfulness Measure (CAMM; Greco, Baer, & Smith, 2011; Appendix 4) was used in this study to measure mindfulness ability. The CAMM is a 10-item measure of mindfulness skills, which asks questions based on three facets of mindfulness (observing, acting with awareness, and accepting without judgment), on which participants are asked to rate how often each sentence is true for them on a 5-point Likert scale (0= never true, 1= rarely true, 2= sometimes true, 3= often true and 4= always true). Items are phrased to ask about mindlessness, for example “At school, I walk from class to class without noticing what I’m doing”. A total mindfulness score is then computed by reverse scoring and summing all items, with a possible range of 0-40, where a higher score indicates higher levels of acceptance and mindfulness.

The CAMM has been validated with school-aged children and adolescents, and has been found to have adequate internal consistency with a Cronbach’s alpha level of 0.81 (Greco, et al., 2011). Greco et al. (2011) and de Bruin et al. (2013) found the CAMM to have good internal consistency across two populations, and good convergent and incremental validity. Significant moderate to strong correlations were also found between the CAMM and measures of happiness, healthy self-regulation and quality of life, whereas significant negative correlations were seen with stress, rumination and catastrophising.



v. *The Strengths and Difficulties Questionnaire (SDQ)*

The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997; Appendix 5) was used to measure social, emotional and behavioural difficulties in this study. The SDQ is a brief, 25-item screening tool, used with children and adolescents aged 4-17 years old, which has items relating to five subscales: 1. emotional symptoms, 2. conduct problems, 3. hyperactivity/inattention, 4. peer relationship problems and 5. pro-social behaviour (Goodman, 1997). Respondents are asked to rate their agreement for each item on a 3-point Likert scale (0=not true, 1=somewhat true, 2=certainly true), based on how things have been over the last six months. Scores can be calculated for each subscale, for total internalising and externalising difficulties, as well as summing all subscales (except pro-social behaviour) to derive a total difficulties score. The total difficulties scores can range from 0-40, where scores over 20 indicate a risk of developing a clinically significant problem.

The SDQ is widely used in clinical and research settings to look at internalising and externalising problems in adolescents, it has good psychometric properties with a Cronbach's alpha of 0.73, is validated to use with children aged 11 years and over (Goodman, 2001) and is brief to administer.

*Teacher-rated questionnaires*

i. *The Strengths and Difficulties Questionnaire (SDQ)*

The teacher-rated version of the SDQ (Appendix 6), described above, was used, together with the self-reported version. Given the limitations of self-report questionnaires, which may have been particularly present here given the nature of the

questions on the SDQ, it was felt the use of multiple informants would yield more accurate data.

ii. *Adolescent Symptom Inventory (ASI-4)*

The Adolescent Symptom Inventory (ASI-4; Gadow & Sprafkin, 1998) is a behaviour rating scale used for adolescents to screen for DSM-IV emotional and behavioural disorders. The teacher-rated Conduct Disorder scale of the ASI-4 (Appendix 7) was used in this study to determine levels of conduct problems. The Conduct Disorder scale has 9 items relating to adolescent behaviour, rated on a 4-point Likert scale (0= never, 1= sometimes, 2= often, 3= very often) as to how often each behaviour occurs. A symptom severity score is calculated by adding the scores for the 9 items, which measures the degree of behavioural variance compared with a normative sample. Scores of 6 and above are considered high severity symptoms. The ASI-4 has demonstrated good levels of concurrent and predictive validity and has been validated for use with adolescents (Gadow, & Sprafkin, 1998). It has demonstrated moderate to good levels of internal consistency with Cronbach's alpha coefficients ranging from 0.62-0.90 for the teacher-rated version. All domains of the scale have also demonstrated good convergent validity and have correlated moderately with other scales (Sprafkin, Volpe, Gadow, Nolan, & Kelly, 2002).

iii. *The Inventory of Callous-Unemotional Traits*

The Inventory of Callous-Unemotional Traits (ICU; Frick, 2004; Appendix 8) was used to measure levels of callous-unemotional traits. The ICU is a 24-item scale which assesses levels of callous-unemotional traits with items relating to callousness and uncaring and unemotional aspects of behaviour. Respondents are asked to rate

items on a 4-point Likert scale (0= not at all true, 1= somewhat true, 2= very true, 3= definitely true). A total score is calculated, where a higher score indicates higher levels of callous-unemotional traits.

The ICU has demonstrated good internal consistency with scores ranging from 0.79 to 0.81 across different studies, and good construct validity in samples of adolescents (Fanti, Frick, & Georgious, 2009; Kimonis et al., 2008; Roose, Bijttebier, Decoene, Claes, & Frick, 2010). The teacher-rated version of this scale was used in the current study, in order to attempt to control for difficulties with self-report (for example, social desirability, which may have been particularly noticeable in this scale) as well as to limit the battery of questionnaires for the participants.

### Psychometric Measures

#### *i. Wechsler Abbreviated Scale of Intelligence (WASI-II)*

The Wechsler Abbreviated Scale of Intelligence-II (WASI-II, Wechsler, 2011; Appendix 9) is a validated brief pencil-and-paper measure of IQ. The Matrices and Vocabulary subtests of the WASI were used to obtain a measure of IQ in this study. IQ was originally measured to exclude participants with an IQ <80, as it was expected this would indicate an inability to complete the cognitive tasks, however all participants were able to complete the tasks therefore this exclusion was not applied to the data.

### **2.3 Procedure**

#### *Service user feedback*

In order to obtain service-user feedback, the first five participants were asked questions about the information sheets, ease of the tasks, the length of the task battery

and any emotional responses to the battery. In response to their experiences, the verbal instructions for the cognitive tasks were adapted to make these clearer and easier to understand. Participants fed-back that the length of the battery was quite long, however as this could not be altered it was ensured that it was clearly communicated to participants how long the tasks would take, and that they understood they could stop or take breaks at any time if necessary.

### *Procedure*

Informed consent was obtained from the participating schools, as well as parents, who were sent full information about the project and were given the opportunity to consent to their child participating in the study or not. One school requested opt-in consent (Appendix 10), therefore parents were sent letters actively consenting to their child's participation in the study. For all other schools, an opt-out consent process was used, whereby parents responded only if they did not consent to their child taking part in the study (see Appendix 11). Participants and teachers were also provided with study information and gave consent themselves, as described below.

At the time of testing, participants were given an information sheet, outlining the purpose of the study and what it would involve, and a consent form (Appendix 12). Each participant was tested individually by the researcher or research assistant in a private room within the school. Testing took approximately 45 minutes to complete. Confidentiality rules and limitations were verbally explained to each participant. The instructions for each of the tasks were explained, and participants were informed that they could take breaks or stop at any time. Participants were asked to answer the questions as honestly as possible and told that there were no correct answers. The researcher remained present at all times to assist and/or answer any questions if

necessary. Participants were logged-in to the computerised battery by the researcher using a unique code to ensure anonymity. A separate password-protected word document was kept to identify each participant.

The tasks were presented in the following order: Informed consent gained, WASI matrices and vocabulary subtests administered, the computerised battery (demographics, flanker task, questionnaires, emotional n-back). The self-reported questionnaires appeared in the following order: CAMM, DERS, ERQ, SDQ.

The teacher-rated questionnaires (ASI, SDQ, ICU) were developed into a pack and administered to teachers in paper form, along with an information sheet and consent form. The pack also contained a page of brief initial questions about the length of time the teacher had known the pupil, how well they knew the pupil and if they were aware of any diagnoses, medication or statement of special educational needs of the pupil (see Appendix 13). Teachers were asked to complete these packs for each adolescent taking part in the study and to return them to the researcher. Each pack was then labelled with each participant's ID code to ensure anonymity.

Following testing, participants were thanked for their participation, informed about their entry into the prize draw to win vouchers, and given the opportunity to ask questions. They were reminded about how their data would be used and of their right to withdraw at any time. Given the potentially sensitive issues that may have been brought up by the questionnaire measures, it was explained that if they had anything they wanted to discuss or if they felt distressed by the questions they should speak to their teacher, someone at the their school or they could contact the researcher, and were given a debrief sheet (Appendix 14).

## **Chapter 3: Results**

### **3.1 Data Screening**

Prior to data analysis missing values were checked. For the questionnaire data, missing values were interpolated if participants had completed at least half of the items. For the cognitive tasks, missed trials were omitted from the analyses.

All variables were checked for normality, where z scores for skewness and kurtosis that were greater than 2.58 were considered significantly non-normal (Field, 2005).

On the questionnaire data, a significant positive skew was found for ASI total ( $z=4.99, p<.05$ ), the non-acceptance ( $z=3.91, p<.05$ ) and strategies ( $z=2.65, p<.05$ ) subscales of the DERS, the emotion ( $z=3.18, p<.05$ ), peer ( $z=3.49, p<.05$ ), and internalising ( $z=3.15, p<.05$ ) subscales of the self-rated SDQ, and on the following subscales of the teacher-rated SDQ: emotional symptoms ( $z=6.64, p<.05$ ), conduct problems ( $z=3.16, p<.05$ ), peer problems ( $z=5.08, p<.05$ ) and internalising problems ( $z=6.39, p<.05$ ). As these were moderately positively skewed, square root transformations were carried out on all of the variables above to transform the data (Howell, 2007), which resulted in normal distributions: ASI total ( $z=1.39, p>.05$ ), DERS non-acceptance ( $z=1.93, p>.05$ ), DERS strategies ( $z=1.51, p>.05$ ), SDQ emotional symptoms ( $z=-0.98, p>.05$ ), SDQ peer problems ( $z=-0.54, p>.05$ ), SDQ internalising problems ( $z=0.02, p>.05$ ), teacher-rated SDQs emotional problems ( $z=1.74, p>.05$ ), conduct problems ( $z=0.35, p>.05$ ), peer problems ( $z=0.88, p>.05$ ) and internalising problems ( $z=1.50, p>.05$ ), allowing parametric tests to be used.

Boxplots showed that one individual on the ICU total score variable fell slightly above three standard deviations from the mean (scoring 57 when the upper limit was

56.26). As this score was so borderline, this individual was kept in the initial analysis, however tests including this variable were checked excluding this individual to ensure it made no significant difference. There were no other scores that fell further than three standard deviations from the mean on any other variable.

### **3.2 Participant Demographics**

The breakdown of demographics by group is shown in Table 1.

#### **Gender, age and ethnicity**

The total sample consisted of 16 females and 45 males (n=61) ranging from 11 to 16 years (mean age = 14.21, SD = 1.37). There were no significant differences between the groups on gender ( $\chi^2(1) = 0.43$ ,  $p=.51$ ) or age ( $t(58) = 0.083$ ,  $p=.93$ ).

In terms of ethnicity, 44.3% of the total sample was Black, 23% was White, 21.3% was of Mixed ethnicity, 9.8% was Asian and 1.6% classified themselves as Other. Fisher's Exact Test was reported as 4 cells had an expected count less than 5. There was a significant difference between ethnicity between the two groups ( $\chi^2(4) = 14.35$ ,  $p=.03$ ). There were higher numbers of Black and Asian participants in the control group, but higher numbers of White, Mixed and Other ethnicities in the SEBD group.

#### **Social economic status**

Postcode was used as an approximate measure of social economic status. Postcodes were converted into area deprivation scores and area deprivation ranks (where 1= the most deprived area and 32482 = least deprived area) using a government tool downloaded from: <http://www.education.gov.uk/cgi-bin/inyourarea/idaci.pl>.

The mean percentage area deprivation rank for the total sample was 0.24 (SD = 0.26).

There were no significant differences in SES deprivation scores between the SEBD group and the control group ( $t(43) = 1.72, p=.09$ ).

## IQ

The mean total IQ for the whole sample was 91.9 (SD = 18.2). Participants in the SEBD group had significantly lower total IQ scores compared to the control group ( $t(55) = -3.74, p< .001$ ).



Table 1: Breakdown of participant demographics by group.

Demographic	SEBD group		Control group	Sig. difference
Gender	Frequency:		Frequency:	n.s
	Males:	24	Males: 21	
	Females:	7	Females: 9	
	Total:	31	Total: 30	
Age	Mean:	14.22	Mean: 14.19	n.s
	SD:	1.34	SD: 1.37	
	Range min:	11.37	Range min: 11.25	
	Range max:	16.13	Range max: 16.03	
Ethnicity	Frequency:		Frequency:	$(\chi^2(4) = 14.35,$ $p=.03)$
	Asian:	1	Asian: 5	
	Black:	9	Black: 18	
	White:	12	White: 2	
	Mixed:	8	Mixed: 5	
	Other:	1	Other: 0	
SES	Mean:	0.30	Mean: 0.18	n.s
	SD:	0.33	SD: 0.15	
	Range min:	.00	Range min: .00	
	Range max:	.98	Range max: .60	
Total IQ	Mean:	84.29	Mean: 100.10	$t(55) = -3.738,$ $p<.001,$ SEBD<Control
	SD:	18.77	SD: 13.76	
	Range min:	46.00	Range min: 72.00	
	Range max:	124.00	Range max: 127.00	

### **3.3 Questionnaire data**

The two groups were compared on the different variables measured to identify any significant main effects of these variables.

#### **Self-reported questionnaires**

The means, SDs and ranges for the scores on the self-reported questionnaires (CAMM, ERQ, DERS and SDQ) are shown in Table 2.

Table 2: Means, SDs and ranges for self-reported questionnaire scores.

<b>Questionnaire Variable</b>	<b>SEBD</b>	<b>CON</b>	<b>Sig difference?</b>
CAMM total score.	Mean: 24.04 SD: 8.77 Range min: 5.00 Range max: 40.00	Mean: 24.87 SD: 8.25 Range min: 6.00 Range max: 40.00	n.s.
ERQ reappraisal.	Mean: 18.38 SD: 5.20 Range min: 7.00 Range max: 27.00	Mean: 19.03 SD: 5.44 Range min: 6.00 Range max: 28.00	n.s.
ERQ suppression.	Mean: 11.93 SD: 3.45 Range min: 7.00 Range max: 20.00	Mean: 12.04 SD: 3.71 Range min: 4.00 Range max: 18.00	n.s.

DERS non-acceptance of emotional responses.	Mean: 12.43 SD: 6.42 Range min: 6.00 Range max: 29.00	Mean: 11.03 SD: 5.36 Range min: 6.00 Range max: 26.00	n.s.
DERS difficulty engaging in goal directed behaviour.	Mean: 16.31 SD: 5.27 Range min: 6.00 Range max: 25.00	Mean: 14.59 SD: 5.83 Range min: 5.00 Range max: 25.00	n.s.
DERS impulse control difficulties.	Mean: 16.24 SD: 6.02 Range min: 6.00 Range max: 30.00	Mean: 12.65 SD: 6.14 Range min: 6.00 Range max: 26.00	p=.03
DERS lack of emotional awareness.	Mean: 19.52 SD: 5.23 Range min: 8.00 Range max: 30.00	Mean: 17.47 SD: 6.20 Range min: 6.00 Range max: 30.00	n.s.
DERS limited access to emotion regulation strategies.	Mean: 20.26 SD: 7.88 Range min: 8.00 Range max: 39.00	Mean: 16.92 SD: 7.88 Range min: 8.00 Range max: 37.00	n.s.
DERS lack of emotional clarity.	Mean: 11.59 SD: 3.48 Range min: 6.00 Range max: 19.00	Mean: 11.96 SD: 4.22 Range min: 5.00 Range max: 21.00	n.s.

DERS total score.	Mean: 96.16 SD: 23.43 Range min: 55.00 Range max: 143.00	Mean: 84.77 SD: 23.27 Range min: 50.00 Range max: 131.29	n.s.
SDQ emotional symptoms.	Mean: 3.64 SD: 2.66 Range min: .00 Range max: 10.00	Mean: 2.79 SD: 2.15 Range min: .00 Range max: 9.00	n.s.
SDQ conduct problems.	Mean: 3.31 SD: 1.82 Range min: .00 Range max: 8.00	Mean: 2.54 SD: 1.75 Range min: 1.00 Range max: 7.00	n.s.
SDQ hyperactivity/attention.	Mean: 4.96 SD: 2.40 Range min: 1.00 Range max: 10.00	Mean: 3.83 SD: 2.13 Range min: .00 Range max: 7.00	n.s.
SDQ peer problems.	Mean: 2.80 SD: 2.07 Range min: .00 Range max: 8.00	Mean: 1.57 SD: 1.93 Range min: .00 Range max: 9.00	p=.02
SDQ prosocial behaviour.	Mean: 7.03 SD: 1.99 Range min: 1.00 Range max: 10.00	Mean: 7.57 SD: 1.59 Range min: 5.00 Range max: 10.00	n.s.

SDQ externalising problems.	Mean: 8.27 SD: 3.49 Range min: 2.00 Range max: 18.00	Mean: 6.37 SD: 3.08 Range min: 1.00 Range max: 12.00	p=.03
SDQ internalising problems.	Mean: 6.44 SD: 4.33 Range min: .00 Range max: 18.00	Mean: 4.36 SD: 3.31 Range min: 1.00 Range max: 14.00	p=.04
SDQ total difficulties score.	Mean: 14.71 SD: 6.17 Range min: 5.00 Range max: 34.00	Mean: 10.66 SD: 5.69 Range min: 2.00 Range max: 26.00	p=.01

Independent samples t-tests were used to compare the self-reported questionnaire scores between the SEBD group and the control group. On the CAMM measure of mindfulness, there was no significant difference between the two groups ( $t(58) = -.38$ ,  $p=.71$ ). There were no significant differences between the two groups on the ERQ subscales of reappraisal ( $t(87) = -0.47$ ,  $p=.64$ ) and suppression ( $t(58) = -0.12$ ),  $p=.91$ ). On the DERS measure of emotion regulation, there was no significant difference on the total score between the two groups, although this was approaching significance ( $t(57) = 1.87$ ,  $p=.06$ ). On the subscales of the DERS, there was a significant difference between the two groups on impulse control difficulties ( $t(56) = 2.25$ ,  $p=.03$ ), where the SEBD group had significantly higher scores than the controls. There were no significant difference between the two groups on the following subscales: non-

acceptance of emotional responses ( $t(56) = .89, p=.38$ ), difficulties engaging in goal directed behaviour ( $t(56) = 1.18, p=.24$ ), lack of emotional awareness ( $t(57) = 1.37, p=.18$ ), limited access to emotion regulation strategies ( $t(57) = 1.63, p=.11$ ), and lack of emotional clarity ( $t(57) = -.37, p=.71$ ).

On the SDQ, there was a significant difference between the two groups, with the SEBD group scoring significantly higher on the SDQ total difficulties ( $t(57) = 2.62, p=.01$ ). On the subscales of the SDQ there was a significant difference between the two groups on peer problems ( $t(58) = 2.48, p=.02$ ), total externalising problems ( $t(58) = 2.23, p=.03$ ), and total internalising problems ( $t(57) = .26, p=.04$ ), with the SEBD group scoring significantly higher on each. However, there were no significant differences between the two groups on the individual subscales which comprise the externalising and internalising scores: emotional symptoms ( $t(57) = 1.25, p=.22$ ), conduct problems ( $t(58) = 1.68, p=.10$ ), hyperactivity/inattention ( $t(58) = 1.92, p=.06$ ), or prosocial behaviour ( $t(58) = -1.22, p=.23$ ).

#### Teacher-rated questionnaires

The means, SDs and ranges for the scores on the self-reported questionnaires (SDQ, ICU, ASI) are shown in Table 3.

Independent samples t-tests were used to compare the teacher-rated questionnaire scores between the SEBD group and the control group. On the SDQ total score, there was a significant difference between the two groups, with the SEBD group scoring significantly higher on levels of SDQ total difficulties compared to the control group ( $t(58) = 5.87, p<.001$ ). On the subscales of the SDQ, the SEBD group scored significantly higher on emotional symptoms ( $t(58) = 2.78, p=.007$ ), conduct problems

( $t(58) = .24, p=.009$ ), peer problems ( $t(58) = 3.41, p=.001$ ), hyperactivity/attention ( $t(58) = 3.08, p=.003$ ), internalising problems ( $t(58) = 4.01, p<.001$ ), externalising problems ( $t(58) = 3.56, p=.001$ ). The control group scored significantly higher on prosocial behaviour ( $t(58) = -4.28, p<.001$ ). The SEBD group also scored significantly higher on the ICU measure of callous-unemotional traits ( $t(58) = 4.44, p<.001$ ) and on the ASI measure of conduct problems ( $t(58) = 4.81, p<.001$ ).

Table 3: Means, SDs and ranges for teacher-rated questionnaire scores.

Questionnaire Variable	SEBD	CON	Sig diff?
SDQ emotional symptoms.	Mean: 2.39 SD: 2.66 Range min: .00 Range max: 10.00	Mean: 0.72 SD: 0.84 Range min: .00 Range max: 3.00	$p=.007$
SDQ conduct problems.	Mean: 2.84 SD: 2.52 Range min: .00 Range max: 8.00	Mean: 1.14 SD: 1.43 Range min: .00 Range max: 5.00	$p=.009$
SDQ hyperactivity/attention.	Mean: 4.65 SD: 2.74 Range min: .00 Range max: 10.00	Mean: 2.59 SD: 2.41 Range min: .00 Range max: 8.00	$p=.003$
SDQ peer problems.	Mean: 2.71 SD: 2.53 Range min: .00 Range max: 9.00	Mean: 1.00 SD: 1.34 Range min: .00 Range max: 6.00	$p=.001$

SDQ prosocial behaviour.	Mean: 5.39 SD: 2.76 Range min: .00 Range max: 10.00	Mean: 8.10 SD: 2.08 Range min: 3.00 Range max: 10.00	p<.001
SDQ externalising problems.	Mean: 7.48 SD: 4.60 Range min: .00 Range max: 18.00	Mean: 3.72 SD: 3.46 Range min: .00 Range max: 11.00	p=.001
SDQ internalising problems.	Mean: 5.10 SD: 4.38 Range min: .00 Range max: 19.00	Mean: 1.73 SD: 1.55 Range min: .00 Range max: 8.00	p<.001
SDQ total difficulties score.	Mean: 12.58 SD: 5.31 Range min: 3.00 Range max: 27.00	Mean: 5.45 SD: 3.96 Range min: .00 Range max: 13.00	p<.001
ICU total:	Mean: 26.48 SD: 11.18 Range min: 6.00 Range max: 57.00	Mean: 14.66 SD: 9.27 Range min: 1.00 Range max: 39.00	p<.001
ASI total:	Mean: 3.84 SD: 3.49 Range min: .00 Range max: 13.00	Mean: 0.97 SD: 1.76 Range min: .00 Range max: 8.00	p<.001



### **3.4 Cognitive task data**

#### **Emotional n-back task**

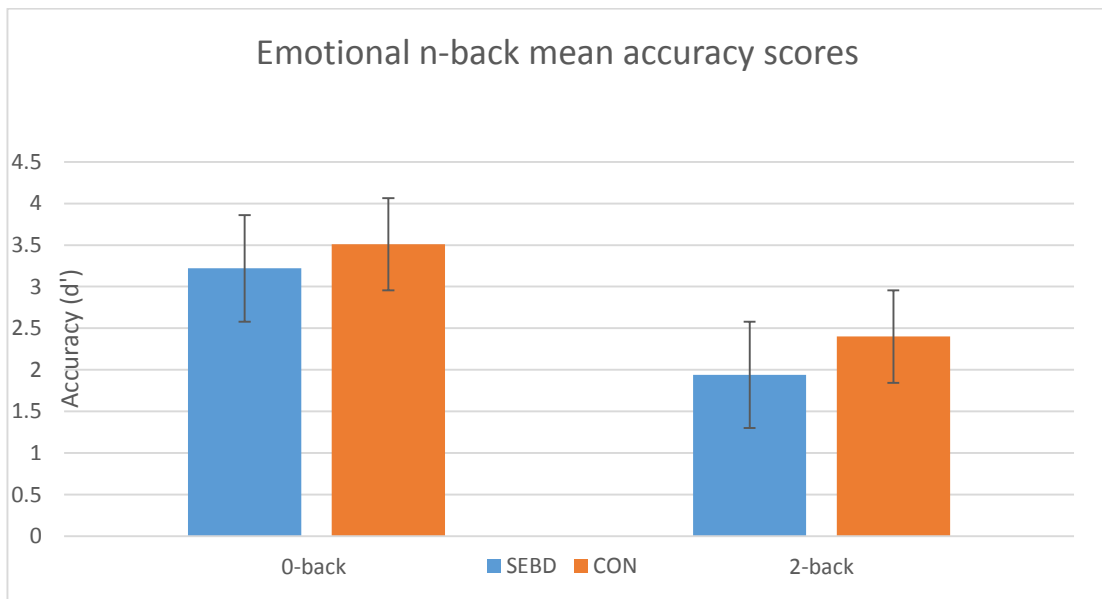
The means, SDs and ranges for the scores on the emotional n-back are shown in Table 4. The number of participants included in the analysis for the emotional n-back task was 56 (SEBD:  $n = 26$ ; control:  $n = 30$ ). In the SEBD group three participants were excluded due to failing to complete the task and two were excluded due to lower than chance accuracy rates.

To analyse data from the emotional n-back task, a group (SEBD vs controls) x emotion (happy, calm, fear, no emotion) x difficulty level (0-back vs 2-back) mixed model ANOVA was used. The ANOVA showed a significant main effect of difficulty ( $F(1, 54) = 47.61, p < .001$ ), with participants having better accuracy on the 0-back condition compared to the 2-back condition. There was no significant main effect of emotion ( $F(3, 162) = 1.46, p = .23$ ), showing that across difficulty and group, accuracy did not differ between the different conditions related to emotion. There was no significant main effect of group ( $F(1, 54) = 1.44, p = .24$ ), showing the SEBD group did not differ from the control group on accuracy on this task. There were also no significant interactions between difficulty and group ( $F(1, 54) = .25, p = .62$ ), between emotion and group ( $F(3, 162) = .77, p = .51$ ), between difficulty and emotion ( $F(3, 162) = .11, p = .95$ ) or between difficulty, emotion and group ( $F(3, 162) = .14, p = .93$ ).

Figure 6 shows the mean accuracy scores for the two difficulty levels within the n-back (0-back and 2-back) for each group.

Table 4: Means, SDs and ranges for the emotional n-back task.

Cognitive task variable	SEBD (n=26)	Control (n=30)	Across both groups (n=56)
n-back-accuracy (d')	Mean: 3.22 SD: 1.11	Mean: 3.51 SD: 1.42	Mean: 3.37 SD: 1.28
0-back:	Range min: .46 Range max: 4.90	Range min: .66 Range max: 6.18	Range min: .46 Range max: 6.18
n-back – accuracy	Mean: 1.94 SD: 1.31	Mean: 2.40 SD: 1.48	Mean: 2.18 SD: 1.41
2-back:	Range min: .41 Range max: 4.98	Range min: .38 Range max: 5.12	Range min: .41 Range max: 5.12



Error bars indicate standard error of the mean

Figure 6: Mean accuracy scores on the two n-back conditions for SEBD and control groups.

### Flanker task

The means, SDs and ranges for the accuracy and reaction times across each condition in the flanker task are shown in Table 5.

For the flanker task, two mixed model ANOVAs were conducted to analyse participants' mean accuracy and reaction times on this task. For both accuracy and reaction time, a group (SEBD vs controls) x cue (congruent vs incongruent) x target (congruent vs incongruent) mixed model ANOVA was conducted.

For accuracy, the ANOVA showed there was no significant main effect of group ( $F(1, 52) = .50, p=.48$ ), showing the SEBD and control groups did not differ on accuracy scores on this task. There was a significant main effect of cue ( $F(1, 52) = 5.01, p=.03$ ): across group and target, participants were more accurate when the cue was congruent (mean accuracy = 92.04%) compared to when the cue was incongruent (mean accuracy = 90.70%). There was also a significant main effect of target ( $F(1, 52) = 59.45, p<.001$ ): across cue and group, accuracy scores were higher when the target was congruent (mean accuracy = 94.65%) compared to incongruent (mean accuracy = 88.10%). There were no significant interactions between cue and group ( $F(1, 52) = 3.00, p=.09$ ), between target and group ( $F(1, 52) = 1.93, p=.17$ ), between cue and target ( $F(1, 52) = 1.95, p=.17$ ) or between all three ( $F(1, 52) = .08, p=.79$ ).

Figure 7a shows the mean accuracy for each condition across both groups.

For reaction time, the ANOVA showed there was no significant main effect of group ( $F(1, 52) = 0.01, p=.98$ ), showing the SEBD and control groups did not differ significantly on their reaction times on this task. There was a main effect of cue ( $F(1, 52) = 178.13, p<.001$ ): ignoring target and group, reaction times were quicker when

the cue was congruent, compared to when it was incongruent. There was also a main effect of target ( $F(1, 52) = 380.90, p < .001$ ), meaning that across cue and group, reaction time was quicker when the target was congruent compared to when it was incongruent. There was a significant interaction between cue and target ( $F(1, 52) = 13.50, p = .001$ ). Post-hoc tests showed that reaction time was significantly quicker when the target was congruent compared to incongruent, when the cue was congruent ( $p < .001$ ), and were also significantly quicker when the target was congruent compared to incongruent, when the cue was incongruent ( $p < .001$ ).

To investigate the interaction, two new variables were created: the difference in reaction time between the two target conditions when the cue was congruent, and the difference between the two target conditions when the cue was incongruent. A post-hoc t-test showed there was a significant difference between these two variables ( $t(53) = 3.59, p = .001$ ), showing the difference in reaction time between the two target conditions when the cue was congruent (mean = -88ms) was significantly smaller than the difference in reaction time between the two target conditions when the cue was incongruent (mean = -120ms).

There were no significant interactions between cue and group ( $F(1, 52) = .01, p = .93$ ), between target and group ( $F(1, 52) = .21, p = .65$ ) or between cue, group and target ( $F(1, 52) = 1.01, p = .32$ ).

The mean reaction times (ms) for each condition across both groups are shown in Figure 7b.

Table 5: Means, SDs and ranges for the flanker task data.

	<b>SEBD (n=24)</b>	<b>Control (n=30)</b>	<b>Across both groups (n=54)</b>
Accuracy (% correct)	Mean: 94.14 SD: 8.16	Mean: 95.52 SD: 9.14	Mean: 94.91 SD: 8.66
Condition 1 (cue congruent/target congruent)	Range min: 61.46 Range max: 0.00	Range min: 50.00 Range max: 100.00	Range min: 50.00 Range max: 100.00
Accuracy (% correct)	Mean: 94.62 SD: 9.48	Mean: 94.31 SD: 9.25	Mean: 94.44 SD: 9.26
Condition 2 (cue incongruent/targ et congruent)	Range min: 54.17 Range max: 0.00	Range min: 50.00 Range max: 100.00	Range min: 50.00 Range max: 100.00
Accuracy (% correct)	Mean: 87.20 SD: 10.89	Mean: 91.32 SD: 10.26	Mean: 89.49 SD: 10.65
Condition 3 (cue congruent/target incongruent)	Range min: 51.04 Range max: 96.88	Range min: 47.92 Range max: 100.00	Range min: 47.92 Range max: 100.00
Accuracy (% correct)	Mean: 86.11 SD: 9.65	Mean: 87.78 SD: 11.98	Mean: 87.04 SD: 10.94
Condition 4 (cue incongruent/targ et incongruent)	Range min: 66.67 Range max: 100.00	Range min: 45.83 Range max: 100.00	Range min: 45.83 Range max: 100.00

Reaction time (ms)	Mean: 613 SD: 84	Mean: 612 SD: 98	Mean: 612 SD: 91
Condition 1 (cue congruent/target congruent)	Range min: 463 Range max: 756	Range min: 446 Range max: 887	Range min: 446 Range max: 887
Reaction time (ms)	Mean: 675 SD: 80	Mean: 682 SD: 113	Mean: 679 SD: 99
Condition 2 (cue incongruent/target congruent)	Range min: 468 Range max: 818	Range min: 484 Range max: 985	Range min: 468 Range max: 985
Reaction time (ms)	Mean: 699 SD: 94	Mean: 701 SD: 110	Mean: 700 SD: 102
Condition 3 (cue congruent/target incongruent)	Range min: 524 Range max: 864	Range min: 549 Range max: 1049	Range min: 524 Range max: 1049
Reaction time (ms)	Mean: 802 SD: 101	Mean: 795 SD: 95	Mean: 798 SD: 97
Condition 4 (cue incongruent/target incongruent)	Range min: 604 Range max: 1000	Range min: 627 Range max: 964	Range min: 604 Range max: 1000

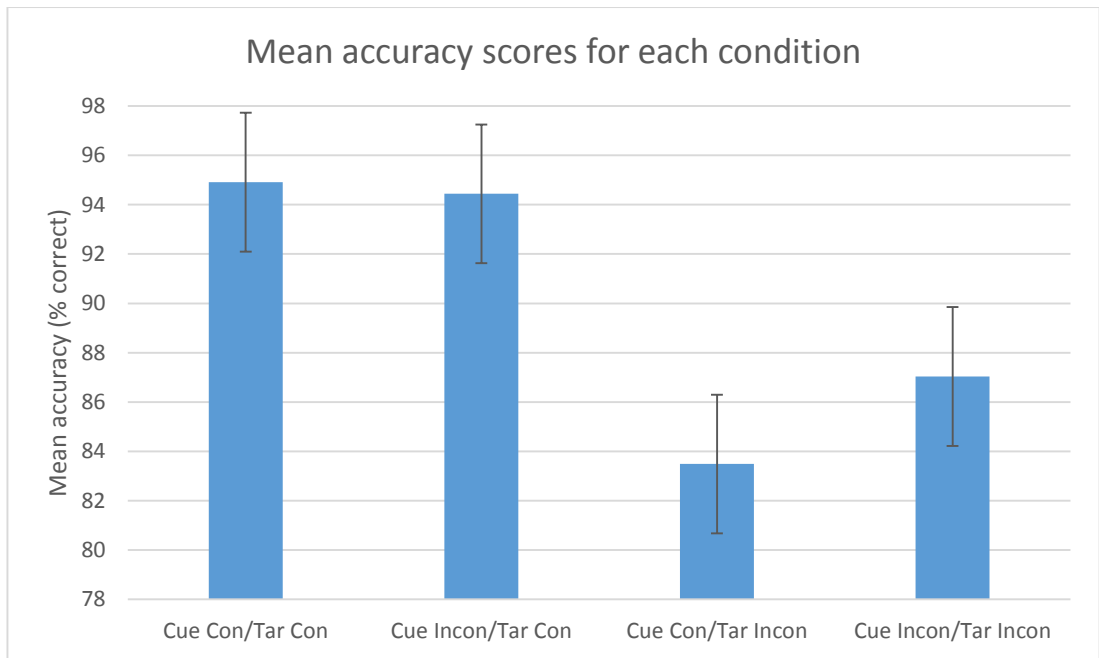


Figure 7a: Flanker task mean accuracy scores for each condition across groups.

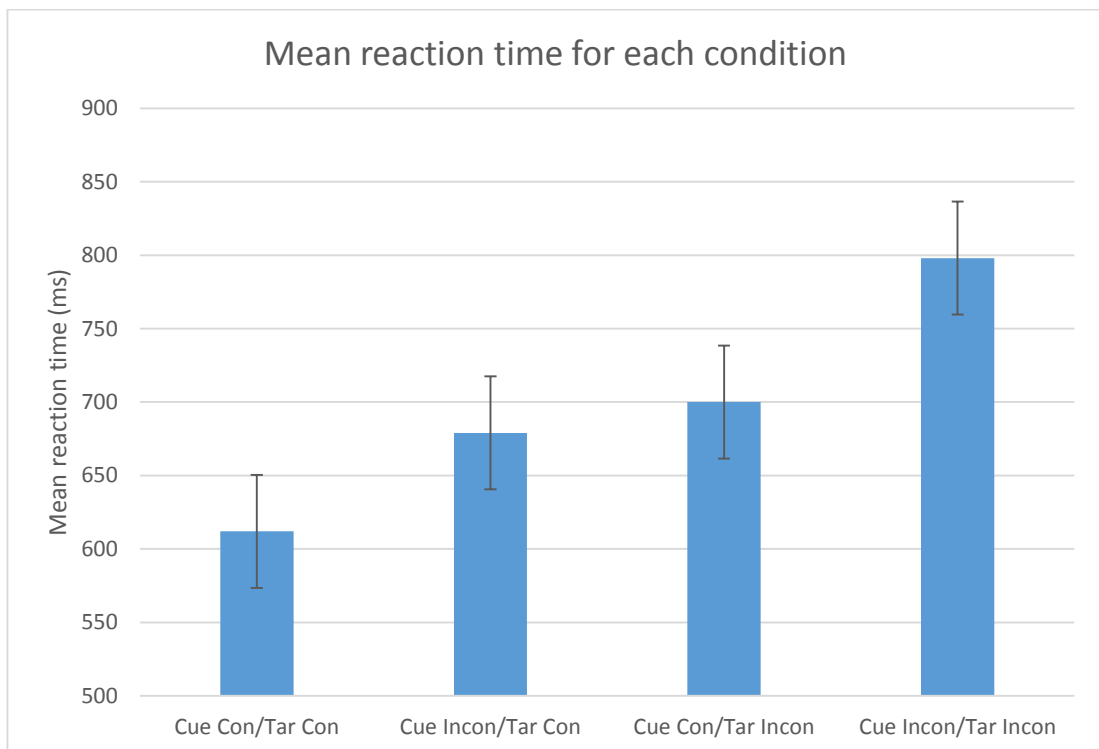


Figure 7b: Flanker task mean reaction times for each condition across groups.

### **3.5 Addressing the hypotheses**

#### **Hypothesis 1**

It was hypothesised that significant positive correlations between emotion regulation, attention and mindfulness in adolescents with SEBD and in controls would be found.

To address hypothesis 1, Pearsons correlations between variables tapping into emotion regulation, attention and mindfulness were conducted. The following variables were included in the correlation analyses.

Emotion regulation: DERS total score (measure of emotion regulation difficulties), ERQ reappraisal subscale (measure of the use of reappraisal emotion regulation strategies), ERQ suppression subscale (measure of the use of suppression emotion regulation strategies). As the emotional n-back task did not return a significant effect of emotion this was not used in the correlation.

Attention: Using reaction time data from the flanker task, variables were created which reflected ability to reorient attention (the difference between the mean reaction time in conditions where the cue was incongruent and where it was congruent), ability to ignore incongruent targets (difference between the mean reaction time in conditions where the target was incongruent and where it was congruent), and a high level attention ability (difference between the two target conditions when the cue was congruent versus incongruent; this variable reflected the interaction effect). For each of these variables, a greater score indicated worse performance. As there was a significant interaction between cue and target on reaction time and not accuracy, only reaction time data were used here.



The SDQ hyperactivity/inattention subscale, both the self-reported and teacher-rated versions, were also included as measures of attention difficulties.

Mindfulness: CAMM (measure of mindfulness ability).

Correlations were looked at for the whole sample and for the two groups separately.

There were no significant differences between the groups on any of the variables used in the correlation, therefore it was assumed that group differences would not distort the true relationships. Participants who did not complete the flanker task were excluded from the correlation analyses. The remaining sample included 24 SEBD participants and 30 control participants. Fishers z tests were conducted to identify whether there were significant differences between the correlations of the two groups.

Table 6 shows the Pearsons correlations, significance levels, and whether there was a significant difference between these correlations between the two groups (z score and p-value).

Table 6: Correlations between emotion regulation, attention and mindfulness variables.

<b>Correlation</b>	<b>Across both groups</b>	<b>SEBD (n=24)</b>	<b>Control (n=30)</b>	<b>Significant difference between groups?</b>
DERS – reorient attention	-.05	.06	-.21	n.s
DERS – ignore incongruent	-.10	-.19	-.08	n.s
DERS – high attention	.12	.19	.01	n.s
DERS – SDQ attention (self-report)	.49**	.25	.62**	n.s
DERS – SDQ attention (teacher rated)	-.18	-.60**	-.06	$z=-2.18, p=.03$ Stronger negative correlation in SEBD.
ERQ-R – reorient attention	-.29*	-.31	-.26	n.s
ERQ-R – ignore incongruent	.09	.10	.10	n.s
ERQ-R – high attention	-.01	.14	-.08	n.s
ERQ-R – SDQ attention (self-report)	-.16	-.40	.08	n.s

ERQ-R – SDQ attention (teacher-rated)	-.09	.31	-.37*	$z=2.44, p=.01$  Stronger negative correlation in controls.
ERQ-S – reorient attention	-.31*	-.52**	-.08	n.s
ERQ-S – ignore incongruent	-.28*	-.09	-.39*	n.s
ERQ-S – high attention	-.04	-.24	.09	n.s
ERQ-S – SDQ attention (self-report)	-.03	-.32	.23	$z=1.94, p=.05$  Stronger negative relationship in controls.
ERQ-S – SDQ attention (teacher-rated)	-.20	-.18	-.22	n.s
CAMM- DERS	-.67**	-.67**	-.70**	n.s
CAMM- ERQ-R	-.33**	-.20	-.46**	n.s
CAMM- ERQ-S	-.53**	-.58**	-.50**	n.s
CAMM – reorient attention	.35**	.36	.34	n.s
CAMM– ignore incongruent	-.03	-.01	-.04	n.s
CAMM – high attention	-.04	.02	-.07	n.s

CAMM – SDQ attention (self-report)	-.25*	.07	-.56**	$z=2.42$ , $p=.02$ Stronger negative relationship in controls.
CAMM – SDQ attention (teacher-rated)	.20	.32	.14	n.s

\*. Correlation significant at the .05 level (2-tailed).

\*\*. Correlation significant at the .001 level (survives multiple comparisons correction).

n.s. Non-significant difference.

### Emotion regulation and attention

Partly supporting the hypothesis, Pearson correlations revealed there was a significant positive correlation between the DERS total score and the self-reported SDQ attention subscale, therefore, as predicted, higher scores of difficulty in emotion regulation were associated with higher scores of difficulties with attention, in the control group ( $r(28) = .62$ ,  $p<.001$ ), but not in the SEBD group. This was not a significant difference. The significant correlation held when looked at across both groups together ( $r(51) = .49$ ,  $p<.001$ ).

There was a significant negative correlation between the DERS and the teacher-rated SDQ attention subscale, therefore higher scores of difficulty in emotion regulation were associated with lower scores of difficulty in attention in the SEBD group ( $r(21) = -.60$ ,  $p=.001$ ) but not in the control group. This reflected a significant difference between the two groups ( $z=2.18$ ,  $p=.01$ ). The significant correlation did not hold across both groups together.

There was a significant negative correlation between the ERQ reappraisal subscale and the ability to reorient attention score from the flanker task, therefore as predicted by the hypothesis, higher scores on the ERQ reappraisal subscale of emotion regulation were associated with a better ability to reorient attention, across both groups together ( $r(52) = -.29, p=.02$ ), but this was not significant for either group when looked at separately.

There was a significant negative correlation between the ERQ reappraisal subscale and the teacher-rated SDQ attention subscale, therefore, as predicted by the hypothesis, higher scores on the ERQ reappraisal subscale were associated with lower scores of difficulty in attention, in the control group only ( $r(27) = -.37, p=.03$ ). There was a significant difference in correlation between the two groups ( $z=2.44, p=.01$ ), with a stronger negative correlation in the control group compared to the SEBD group. The significant correlation did not hold across both groups together.

There was a significant negative correlation between the ERQ suppression subscale and the ability to reorient attention score from the flanker task, therefore higher scores on the ERQ suppression subscale of emotion regulation (more use of this strategy) were associated with a better ability to reorient attention, in the SEBD group only ( $r(22) = -.52, p=.005$ ). This held across both groups together ( $r(52) = -.31, p=.01$ ); there was no significant difference between the two groups.

There was a significant negative correlation between the ERQ suppression subscale and the ability to ignore incongruent targets score, therefore higher scores on the ERQ suppression subscale (more use of this strategy) were associated with a better ability to ignore incongruent targets, in the control group only ( $r(28) = -.39, p=.02$ ), this held

across both groups ( $r(52) = -.28, p=.01$ ). There was no significant difference between the two groups.

Non-significant correlations are displayed in Table 6.

#### Emotion regulation and mindfulness

Again supporting Hypothesis 1, there was a significant negative correlation between the DERS total score and the CAMM total score, therefore higher scores on the CAMM measure of mindfulness (a greater mindful ability) were associated with lower scores on the DERS (therefore fewer difficulties in emotion regulation), in the SEBD group ( $r(21) = -.67, p<.001$ ) and control group ( $r(28) = -.70, p<.001$ ). This held across both groups together ( $r(51) = -.67, p<.001$ ). The correlations between the two groups were not significantly different.

There was a significant negative correlation between the ERQ reappraisal score and the CAMM total score, therefore higher scores on the CAMM measure of mindfulness (a greater mindful ability) were associated with lower scores on the ERQ reappraisal (less use of this emotion regulation strategy), in the control group only ( $r(28) = -.46, p=.002$ ). This held across both groups together ( $r(52) = -.53, p<.001$ ). The correlations between the two groups were not significantly different.

There was a significant negative correlation between the ERQ suppression score and the CAMM total score, therefore, as predicted by the hypothesis, higher scores on the CAMM measure of mindfulness (a greater mindful ability) were associated with lower scores on the ERQ suppression (less use of this strategy), in the SEBD group ( $r(22) = -.58, p=.002$ ) and control group ( $r(28) = -.50, p=.002$ ). This held across both

groups together ( $r(52) = -.53, p < .001$ ). The correlations between the two groups were not significantly different.

### Attention and mindfulness

There was a significant positive correlation between the ability to reorient attention score and the CAMM total score, therefore higher scores on the CAMM (greater mindful ability) were associated with higher scores on ability to reorient attention (a lower ability to reorient attention), in the SEBD group ( $r(22) = .36, p = .04$ ), the control group ( $r(28) = .34, p = .03$ ) and across both groups together ( $r(52) = .35, p = .005$ ).

There was no significant difference in the correlations between the two groups.

As predicted by Hypothesis 1, there was a significant negative correlation between the self-reported SDQ attention subscale and the CAMM total score, therefore higher scores on the CAMM (greater mindful ability) were associated with lower scores on the SDQ attention subscale (fewer difficulties in attention) in the control group only ( $r(28) = -.56, p = .001$ ). This held across both groups ( $r(52) = -.26, p = .04$ ). There was a significant difference in the correlations between the two groups ( $z = 2.42, p = .02$ ), with a stronger negative correlation in the control group.

### Hypothesis 2

Considering the fundamental role of attention in both emotion regulation and mindfulness, it was hypothesised that the relationship between mindfulness and emotion regulation would be mediated by attention.

To address Hypothesis 2, a mediation analysis using bootstrapping was used. Hayes PROCESS analysis downloaded from: <http://www.afhayes.com/introduction-to-meditation-moderation-and-conditional-process-analysis.htm> was used to conduct the

mediation. Field (2013) recommends testing mediation by assessing the size of the indirect effect, together with its bootstrapped confidence intervals. It is assumed that if the bootstrapped confidence intervals do not include zero, there is likely to be a genuine indirect effect (i.e. a mediation). The size of the indirect effect is expressed using kappa squared ( $\kappa^2$ ), where .01 reflects a small effect, .09 a medium effect and .25 represents a large effect (Field, 2013).

The following variables were used in the mediation analysis as they returned significant results from the correlations in the predicted direction: DERS (as a measure of emotion regulation difficulties), self-reported SDQ attention subscale (as a measure of difficulties with attention) and the CAMM (as a measure of mindfulness ability). The mediation was conducted across both groups together, and in each group separately to see if it held in each individual group. The confidence intervals for the indirect effects were bootstrapped confidence intervals based on 1000 samples.

Across both groups together, the mediation analysis showed that mindfulness significantly predicted emotion regulation difficulties,  $b = -1.83$ , 95% CI [-2.40, -1.25],  $t = -6.41$ ,  $p < .001$ ; as mindfulness ability increases, difficulties in emotion regulation decline. The mediation showed that inattention also significantly predicted emotion regulation difficulties,  $b = 3.53$ , 95% CI [1.45, 5.61],  $t = 3.41$ ,  $p = .001$ ; as difficulties with attention increased, emotion regulation difficulties increased also. Finally, the mediation analysis showed that mindfulness significantly predicted inattention,  $b = -.07$ , 95% CI [-.14, .04],  $t = -2.00$ ,  $p = .05$ ; as mindfulness ability increased, difficulties in attention decreased. There was a significant indirect effect of mindfulness on emotion regulation difficulties through difficulties in attention,  $b = -$



.25, 95% BCa CI [-.71, .02]. This represents a medium mediation effect,  $\kappa^2 = .12$ , 95% CI [.01, .27]. This is depicted in Figure 8 below.

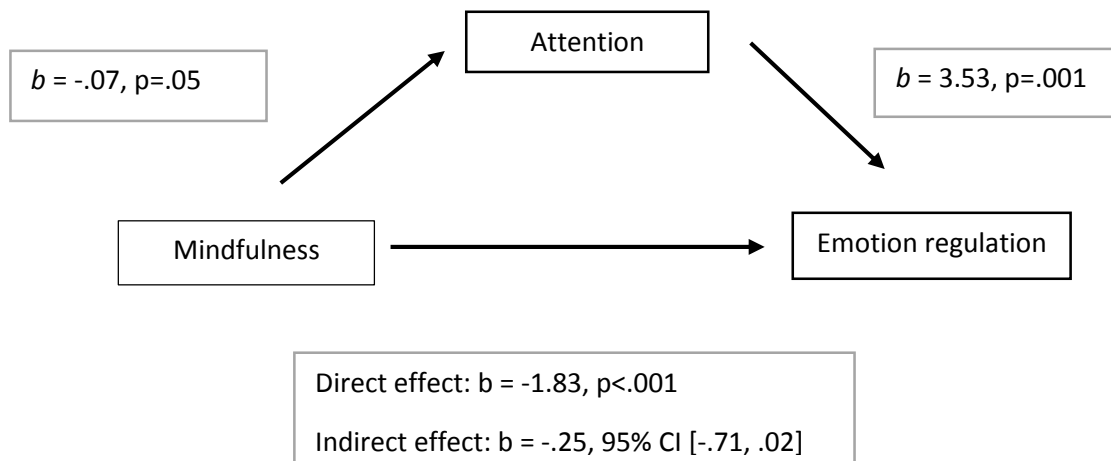


Figure 8: Mediating effect of attention on the relationship between mindfulness and emotion regulation.

Looking at the two groups separately, in the control group ( $n=30$ ), the mediation showed mindfulness significantly predicted emotion regulation difficulties,  $b = -1.97$ , 95% CI [-2.75, -1.19],  $t = -5.16$ ,  $p < .001$ ; as mindfulness ability increases, difficulties in emotion regulation decline. The mediation showed that inattention also significantly predicted emotion regulation difficulties,  $b = 3.60$ , 95% CI [.17, 7.02],  $t = 2.16$ ,  $p = .04$ ; as difficulties with attention increased, emotion regulation difficulties increased also. Finally, the mediation analysis showed that mindfulness significantly predicted inattention,  $b = -.14$ , 95% CI [-.23, -.06],  $t = -3.53$ ,  $p = .002$ ; as mindfulness ability increased, difficulties in attention decreased. There was a significant indirect effect of mindfulness on emotion regulation through inattention,  $b = -.52$ , 95% BCa

CI [-1.07, -.13]. This represents a medium to large mediation effect,  $\kappa^2 = .21$ , 95% CI [.04, .37].

There was no significant mediation effect in the SEBD group alone.

### Hypothesis 3

Hypothesis 3 predicted that there would be stronger relationships between emotion regulation, attention and mindfulness in adolescents with low levels of callous-unemotional traits compared to those with high levels.

To address this hypothesis, a median split based on the ICU total score (measure of callous-unemotional traits) was used to group the SEBD participants ( $n=24$ ) depending on whether they had high or low levels of callous-unemotional traits. The same correlations were then looked at separately for these groups, and Fishers z tests were used to determine whether the correlations were significantly different in those with low levels of callous-unemotional traits compared to those with high levels.

Table 7 shows the correlation values, significance levels, and whether there was a significant difference between the two groups.

There was a significant difference between those with low levels of callous-unemotional traits and those with high levels of callous-unemotional traits on the correlation between the ERQ-reappraisal subscale and the CAMM ( $z=1.75$ ,  $p=.04$ ), with a significant negative correlation in the high callous-unemotional trait group only. There were no other significant differences between the two groups (see Table 7).

Table 7: Correlations between emotion regulation, attention and mindfulness variables for those with high and low levels of callous-unemotional traits.

<b>Correlation</b>	<b>Low CU traits (n=11)</b>	<b>High CU traits (n=13)</b>	<b>Significant difference between groups?</b>
DERS – reorient attention	.17	.21	n.s
DERS – ignore incongruent	.21	.51*	n.s
DERS – high attention	.58*	.49	n.s
DERS – SDQ attention (self-report)	.03	.11	n.s
DERS – SDQ attention (teacher rated)	-.39	.29	n.s
ERQ-R – reorient attention	-.36	-.26	n.s
ERQ-R – ignore incongruent	-.10	.34	n.s
ERQ-R – high attention	.12	.23	n.s
ERQ-R – SDQ attention (self-report)	-.37	-.45	n.s
ERQ-R – SDQ attention (teacher-rated)	.19	.50	n.s

ERQ-S – reorient attention	-.68*	-.45	n.s
ERQ-S – ignore incongruent	-.18	.25	n.s
ERQ-S – high attention	-.02	-.20	n.s
ERQ-S – SDQ attention (self-report)	-.11	-.59*	n.s
ERQ-S – SDQ attention (teacher-rated)	-.07	-.02	n.s
CAMM- DERS	-.76**	-.29	n.s
CAMM- ERQ-R	.22	-.54*	$z=1.75, p=.04$
CAMM- ERQ-S	-.42	-.46	n.s
CAMM – reorient attention	.01	.05	n.s
CAMM– ignore incongruent	-.03	-.02	n.s
CAMM – high attention	-.27	-.24	n.s
CAMM – SDQ attention (self-report)	-.10	.19	n.s
CAMM – SDQ attention (teacher-rated)	.39	-.20	n.s

\*. Correlation significant at the .01 level (2-tailed).

\*\*. Correlation significant at the .05 level (2-tailed).

n.s. Non-significant difference

## **Chapter 4: Discussion**

### **4.1 Summary of Results**

The results showed that there were significant differences between the SEBD and control groups on measures of overall difficulties, and subscales looking at specific difficulties, more specifically, problems with emotion, attention, conduct problems, and levels of callous-unemotional traits, meaning the SEBD group could be reliably defined as a group with a significant level of difficulties, which distinguished them from adolescents attending mainstream schools. There were no significant differences, however, between the two groups on self-reported levels of difficulties in emotion regulation, difficulties with attention, or levels of mindfulness.

The results from the correlation analyses supported Hypothesis 1 and showed there were significant correlations between emotion regulation, attention and mindfulness in both groups when using particular measures of these variables.

Hypothesis 2 was also supported, with the results showing a significant mediating effect of attention in the relationship between mindfulness and emotion regulation.

This was only significant in the sample as a whole, and the control group alone, it did not remain significant when looking at the SEBD group only.

Finally, the results showed little support for Hypothesis 3, which predicted differences in the strength of the correlations between emotion regulation, attention and mindfulness in those in the SEBD group with low levels of callous-unemotional traits as compared to those with high levels of callous-unemotional traits.

## **4.2 Results from the questionnaire measures**

On the self-reported questionnaire measures used to measure emotion regulation (DERS; ERQ), attention (SDQ hyper/attention subscale), and mindfulness (CAMM), the results showed that there were no significant differences between the SEBD group and the control group. There was a significant difference between the two groups on the SDQ total difficulties score, total internalising score and total externalising score, with the SEBD group scoring significantly higher on these scores, as predicted by the hypothesis.

On the teacher-rated questionnaires, there were significant differences between the two groups on the SDQ measure of total difficulties, as well as the hyperactivity/inattention subscale, the ICU measure of callous-unemotional traits and the ASI measure of conduct problems. On each of these scales the SEBD group scored significantly higher than the control group, as expected.

The lack of a significant difference in emotion regulation difficulties between the two groups was unexpected, particularly as this group were found to have significantly higher levels of SEBD compared to the control group. Previous research has found difficulties in emotion regulation to be related to SEBD in children and adolescents (Kim & Cicchetti, 2010), therefore it was expected that the SEBD group in this study would have higher levels of difficulties in emotion regulation. The samples in previous studies have been substantially larger, therefore it is possible that the size of the sample in the current study was too small to find a significant difference. It is also possible that the self-reported nature of this scale played a role in these findings. The lack of a significant difference between the two groups may have been due to social desirability responding, where participants did not respond accurately, but in a way

that would appear more favourable, or in ways in which they thought the researcher wanted (Fisher & Katz, 2000). It is also worth considering whether the participants simply lacked insight into their difficulties in emotion regulation or emotion regulation strategies used. Certainly, self-reported measures of emotional awareness and emotion regulation have been criticised, where it has been argued that individuals might not be aware of their emotions and strategies to regulate them (Shepherd & Wild, 2014) or have a level of insight or ability to accurately report on their own emotion regulation strategies (Aldao et al., 2010). This might be particularly true of an SEBD sample, as used in the current study.

#### **4.3 Results from the cognitive tasks**

##### *Emotional n-back*

The emotional n-back task is a measure of implicit emotion regulation which evaluates the interference of different emotions (via fearful, sad, happy, or neutral faces) on a working memory task.

The results from the emotional n-back task revealed there were no significant differences on performance on this task between the SEBD group and the control group. There was no significant main effect of emotion, contrary to what was expected from this task. There was a significant main effect of difficulty, as expected, meaning scores were more accurate in the easier 0-back condition compared to the more difficult 2-back condition. Previous research has found significant differences in performance (as measured by accuracy and reaction time) between the different emotion conditions (for example, Ladouceur et al., 2005), which the current findings did not support. The lack of a significant effect of emotion could be explained by

difficulty; it is possible that participants found the task too difficult, particularly in the 2-back condition, and were perhaps responding more randomly, meaning significant differences between the emotion conditions were not detected. Certainly, the results of the present study showed that both the SEBD and the control group performed significantly worse in the more difficult 2-back condition. The practice trials at the beginning of this task allowed participants to practice prior to the main task. However, to avoid participant frustration, it was decided to allow participants to progress to the main task after three repetitions of the practice, even if criterion accuracy was not reached. This may have led to a floor effects in some participants. However, participants were automatically excluded if their combined error and no response rate for any one condition was >50%, which would have suggested random responding, meaning this should not have presented much of a problem. It is also possible that there was not enough power in this task to detect significant differences as only 24 participants in the SEBD group were able to complete this task.

### *Flanker*

The flanker task is a measure of selective attention in which participants were asked to indicate which direction a central arrow, flanked by either congruently or incongruently facing arrows, was pointing. Trials here were also cued (congruently or incongruently) to the direction of the arrow.

Looking at the accuracy scores from the flanker task, there were no significant differences between the two groups; accuracy was high across both groups. There was a significant main effect of cue, meaning that participants responded more accurately when the cue was congruent compared to incongruent, and a significant main effect of target, meaning responding was more accurate when the target was congruent



compared to incongruent, as expected from this task. There were no significant interactions between group, cue or target, on the accuracy levels in this task.

Looking at the reaction times between the conditions, the results showed again there were no significant differences between the two groups. As expected, a significant main effect of cue was found, meaning reaction times were quicker when the cue was congruent compared to incongruent, and there was a significant main effect of target, meaning participants responded quicker when the target was congruent compared to incongruent. There was also a significant interaction between cue and target; reaction time was fastest when both cue and target were congruent, as expected. These findings are in line with previous research on the flanker task which has demonstrated faster reaction times when targets are congruent compared to incongruent (for example, Davelaar & Stevens, 2009).

#### **4.4 Results in relation to the hypotheses**

##### **Hypothesis 1**

Hypothesis 1 predicted that significant positive correlations between emotion regulation, attention and mindfulness would be found in adolescents with SEBD and in the control group.

The results from the correlation analyses provided partial support for this hypothesis, showing there were significant correlations between emotion regulation, attention and mindfulness in adolescents with SEBD and controls on certain measures.

##### *Emotion regulation and attention*

The results showed that significant positive correlations were found between the DERS measure of total difficulties in emotion regulation and the self-reported

hyperactivity/inattention subscale of the SDQ, meaning that higher levels of difficulties in emotion regulation were associated with higher levels of difficulties with attention, supporting the hypothesis that emotion regulation and attention would be positively correlated. When looking at the two groups separately, however, this correlation was only significant in the control group, not the SEBD group, although this did not represent a significant difference between the two groups.

The results also showed a significant negative correlation between the DERS measure of total difficulties in emotion regulation and the teacher-rated SDQ hyperactivity/inattention subscale, in an unexpected direction, where higher levels of difficulties in attention were associated with fewer difficulties in emotion regulation, in the SEBD group only. This correlation was significantly different from the control group where no significant correlation was found, and it did not remain significant when looking at the two groups as a whole. It is possible that the self-reported nature of the DERS, where adolescents in the SEBD group might have been less able to accurately report of their levels of difficulties in emotion regulation, as described above, contrasted that of the teacher-rated SDQ, resulting in the unexpected direction of the correlation.

There was also a significant negative correlation between the ERQ reappraisal subscale, which indicated levels of the use of cognitive reappraisal as an emotion regulation strategy, and the ability to reorient attention levels from the flanker task. As predicted by the hypothesis, a greater use of cognitive appraisal as an emotion regulation strategy was related to a better ability to reorient attention. This was significant when looking at the two groups as a whole, but did not remain a significant

correlation in either group alone. This may have been because the samples individually were too small to detect significant effects of the cognitive task data.

There was a significant negative correlation between the ERQ reappraisal subscale and the teacher-rated SDQ attention subscale, therefore, as predicted by the hypothesis, more use of cognitive reappraisal as an emotion regulation strategy was associated with lower scores of difficulty in attention, in the control group only. This represented a significantly different correlation compared to the SEBD group. The significant correlation did not hold across both groups together.

The results also showed a significant negative correlation between the ERQ suppression subscale, which indicated levels of the use of suppression as an emotion regulation strategy, and the ability to reorient attention from the flanker task, as well as the ability to ignore incongruent targets on the flanker task. In both correlations, more use of suppression as an emotion regulation strategy was associated with a better ability to either reorient attention or ignore incongruent targets, which was the opposite of the expected direction.

Previous research has shown that emotion regulation and attention are positively related, in other words, better emotion regulation is associated with better attentional abilities (Wadlinger & Isaacowitz, 2011). Since suppression is considered a maladaptive emotion regulation strategy that has been found to relate to poor psychological well-being and functioning (Aldao et al., 2010), it was expected that suppression would be associated with lower abilities on the attentional tasks, which was not supported. It could be that although suppression is thought to be a maladaptive strategy in everyday life, when faced with a timed task, such as the

flanker task, which could elevate stress levels, there is a benefit to suppressing emotions in order to focus on the task, resulting in the relationship found.

The results showed there were no significant correlations between the DERS or ERQ reappraisal subscale and the ability to ignore incongruent targets on the flanker task, contrary to what was predicted by the hypothesis. It is possible that there were differences in participants' baseline reaction times, which affected these results. For example, if a participant was particularly careful they may go slower on every trial, including the baseline trial, meaning their reaction times would not be as affected by the incongruent targets. Additionally, despite instructions to use the cues as much as possible to go faster, participants may or may not have followed these, meaning they would not be affected by whether the cue was congruent or incongruent, resulting in slower congruent cue trials. These could have led to results showing participants were less affected by incongruent targets, therefore no significant correlations were found on these variables. Furthermore, although significant effects of congruency in the ANOVA were found, the different approaches individuals may have taken to completing the task may have added noise which resulted in non-significant correlations. Alternatively, these results could indicate that emotion regulation skills are perhaps more applicable when it comes to the ability to attend more broadly, rather than on specific tasks. This could explain the correlation with measures of total or general difficulties in attention (the SDQ hyperactivity/inattention subscale) seen, but the lack of a significant correlation with the flanker task which measures specific types of attention on a particular task (for example, ignoring incongruent targets).

Indeed, previous research identifying a relationship between emotion regulation and attention have implicated other types of attention in this relationship. In Gross' (1998)

model of emotion regulation strategies, for example, attentional deployment, which is described as an emotion regulation strategy, is said to include rumination (directing attention to feelings and consequences of feelings), as well as concentration (attending to particular aspect) and distraction.

Nevertheless, the current findings provide support for a relationship between emotion regulation and attention, as indicated by certain measures. Specifically, there were significant correlations between measures of emotion regulation and attention in the SEBD group when the SDQ attention subscale was teacher-rated, and when using scores from the flanker task. There were significant correlations between emotion regulation and attention in the control group also, supporting Hypothesis 1.

This is in line with previous research showing emotion regulation and attention are associated. Xing and Isaacowitz (2006), for example, compared participants across three conditions: individuals who were instructed to regulate emotions while watching a series of images, individuals who were told to focus on the information given in the images, and individuals who were told to attend to the images as if they were watching television. They found that those who were explicitly instructed to use emotion regulation strategies paid less attention to the negative images as compared to the positive images, and on the whole, attended to all images less than those in the other conditions, suggesting that direction of attention is used as an emotion regulation strategy, therefore supporting that the two constructs are associated. Van Reekum et al. (2007) also found attention played a key role in the use of emotion regulation strategies. This study found when attempting to use cognitive reappraisal strategies, participants used direction of attention to do so, suggesting that attentional

deployment may be an active component of cognitive appraisal, again demonstrating the relationship between emotion regulation and attention.

#### *Emotion regulation and mindfulness*

The results also showed that the constructs of emotion regulation and mindfulness were significantly correlated, supporting Hypothesis 1. There was a significant negative correlation between the DERS measure of total difficulties in emotion regulation and the CAMM measure of mindfulness ability, meaning that higher levels of mindfulness ability were related to lower levels of difficulties in emotion regulation, as predicted by the hypothesis. This was significant in both groups separately, and together.

There was also a significant correlation between the ERQ reappraisal subscale, indicating levels of the use of cognitive reappraisal as an emotion regulation strategy, and the CAMM measure of mindfulness ability, therefore greater mindfulness ability was associated with less use of cognitive reappraisal as an emotion regulation strategy. This was found to be significant across both groups together, but when looked at in each group separately, it only remained significant in the control group, not the SEBD group, although this did not represent a significant difference between the groups.

While cognitive reappraisal is considered an adaptive emotion regulation strategy (Aldeo et al., 2010), therefore could indicate better emotion regulation, which would be expected to correlate positively with mindfulness, it is likely that cognitive reappraisal does not fit with a mindfulness approach, which is concerned with noticing and accepting (Richie & Bryant, 2012) rather than challenging or changing

thoughts as in cognitive reappraisal, which could explain why the results correlated negatively.

Finally, the results showed that there was a significant negative correlation between the ERQ suppression subscale score and the CAMM measure of mindfulness ability, where higher levels of mindfulness were associated with less use of suppression as an emotion regulation strategy, as expected. This was significant in both groups when looked at separately, and in the sample as a whole. This fits theoretically with a mindfulness approach, which, again, is associated with attending to and accepting thoughts and emotions, therefore is opposed to the suppression of emotions.

These findings support previous research demonstrating a relationship between emotion regulation and mindfulness. Correlational studies have shown that trait mindfulness correlates positively with emotion regulation in adults, supporting the results of the current study (Bullis et al., 2014; Coffey et al., 2010). Experimental research has also demonstrated that mindfulness-based interventions are associated with improvements in emotion regulation (Lyvers et al., 2014; McLaughlin et al., 2011). For example, Metz et al. (2013) reported that a mindfulness-based intervention led to improved emotion regulation skills, including emotional awareness and access to regulation strategies, which further supports a relationship between emotion regulation and mindfulness.

#### *Attention and mindfulness*

The results showed that there was a significant positive correlation between ability to reorient attention from the flanker task and the CAMM measure of mindfulness ability, therefore greater levels of mindfulness ability were related to lower abilities to

reorient attention, contrary to what was expected. Previous research has shown that higher levels of mindfulness are associated with better attentional abilities (Jha et al., 2007; Van den Hurk et al., 2010) and that mindfulness-based interventions can improve levels of attention, and attentional abilities (for example, Bogels et al., 2008). These studies, therefore, do not support the current finding that higher levels of mindfulness were related to a lower attentional ability.

A possible explanation of these findings could be that mindfulness requires a focus on the present moment, which requires being less distracted by worrying thoughts or thoughts in general, and a complete experience (for example, noticing bodily sensations and other surrounding sensory information), which could act as a distractor in brief timed tasks, such as the flanker task, and result in slower reaction times, therefore a lower ability to reorient attention. Although theories and research would suggest that people are better able to focus when being mindful, this might not apply to brief tasks and could be more applicable to more real life tasks. In the flanker task, becoming aware or mindful of distractions and reorienting attention would need to be a quick process, which contrasts real life settings, where mindfulness does not have to be a fast process. It may be that mindfulness is a slightly slower strategy which requires greater emphasis on cognitive strategies which take slightly more time to draw upon, which has resulted in slower reaction times in the flanker task, and therefore the unexpected directions of the correlation.

Supporting Hypothesis 1, the results showed a significant negative correlation between the self-reported SDQ attention subscale of difficulties in attention, and the CAMM measure of mindfulness ability, where higher levels of mindfulness ability were associated with lower levels of difficulties in attention, as expected. This was



significant when looking at both groups together, but was only significant in the control group when looking at the groups separately. This displayed a significant difference between the SEBD and control groups, with a stronger negative correlation in the control group.

As described briefly above, previous research has demonstrated a positive relationship between attention and mindfulness. Studies have demonstrated that mindfulness-based interventions have significant positive effects on attention (Jha et al., 2007; Zeidan et al., 2010). In one particular study, the mindfulness-based intervention was found to improve attention and attention-related behavioural responses, by enhancing specific subcomponents of attention, including alerting, orienting and conflict monitoring (Jha et al., 2007), supporting the relationship between attention and mindfulness. Research has also shown that mindfulness interventions are related to improvements in general attention, attention problems, and improve performance on tests of sustained attention in adolescents with SEBD (Bogels et al., 2008), which support that the relationship between attention and mindfulness is present in this population as well. A more recent study using the flanker task as a measure of attention, however, did not find any significant effects of a mindfulness intervention for adolescents on performance on the flanker task (Lyons, Zelazo, Sommerfeldt, Blakemore, & Dumontheil, in press), which reflect the findings from the current study. It may be that the type of attention that the flanker task taps into does not correlate with mindfulness.

Other possible explanations for the lack of significant correlations on certain tasks could be that different measures tap into different elements of the constructs. In terms of the cognitive measures, this has been considered above, however, the results also

showed differences between the two measures of emotion regulation (the DERS and the ERQ). For example, the DERS was found to significantly correlate with the self-reported SDQ subscale looking at attentional difficulties, but not with the flanker task measures of attention abilities, while the ERQ subscales were found to correlate significantly with the flanker task measure but not with the SDQ subscale of attention. The likely explanation for this is that while they are both measures of emotion regulation, the DERS identifies total difficulties in emotion regulation, while the ERQ looks at the use of two specific emotion regulation strategies, therefore the two measures are tapping into unique aspects of emotion regulation which relate differently to different aspects of attention.

Additionally, considering the differences between the two groups, there were few significant differences in the correlations between the two groups. In the correlation analysis, those who did not complete the cognitive tasks (therefore did not have data for the flanker task, which was included in the correlations) were excluded from these analyses. It is possible that those excluded represented those with higher levels of SEBD (in particular, greater difficulties in attention) leaving the potentially more able SEBD adolescents in the sample. This could have meant the SEBD sample was biased, and one which was more similar to the control group, therefore. Looking at the data, the mean scores on both self- and teacher-rated measures of difficulties in attention were slightly higher in the excluded SEBD sample compared to the SEBD included in the analyses. However no statistical comparisons were made as the excluded group was a much smaller group than the included SEBD group.

Another interesting aspect to consider is the finding of differences between community and clinical samples. A recent meta-analysis found that the effect size of

mindfulness-based interventions was smaller in community samples (for example school-based studies) compared to those conducted in clinical samples (Zoogman et al., 2015), showing that mindfulness-based interventions are more effective when adolescents have a clinical diagnoses or clinical levels of difficulty. It is possible, therefore, that the relationships underlying mindfulness-based interventions, for example the relationships between emotion regulation, attention and mindfulness are also weaker in community samples. This could help explain why not all the correlations in the current study were found to be significant given a community sample was used. This may not have applied to the SEBD group however, who did not necessarily have clinical diagnoses, but whose scores could have reached clinical or near-clinical levels of difficulties. Furthermore, the current study found stronger relationships between these constructs when using certain measures, and a stronger mediation in the control group (which might resemble a community sample) when compared to the SEBD group (which might resemble a more clinical-like sample), contrasting these findings.

In summary, Hypothesis 1 predicted positive correlations between emotion regulation, attention and mindfulness in adolescents with SEBD and the control group. The results showed that there were significant correlations in the predicted direction for emotion regulation and attention, emotion regulation and mindfulness, and attention and mindfulness in both groups, on some of the measures used, providing support for this hypothesis. These findings extend previous research by looking at the correlations between all three of the constructs together, and in a sample of adolescents with SEBD in comparison to a control group, which previous research has not done.

## Hypothesis 2:

Hypothesis 2 predicted that the relationship between mindfulness and emotion regulation would be mediated by attention, given the fundamental role of attention in both emotion regulation and mindfulness.

The mediation analysis provided support for this hypothesis. For a mediation to be found, four conditions must be met (Baron & Kenny, 1986; Field, 2013): mindfulness must significantly predict emotion regulation (x predicts y); mindfulness must significantly predict attention, the mediator (x predicts m); attention must significantly predict emotion regulation (m predicts y); and mindfulness must have a significant indirect effect on emotion regulation, through attention, in other words, a mediating effect. All four conditions were supported in the mediation analysis conducted, supporting the hypothesis that attention mediated the relationship between mindfulness and emotion regulation.

Although the mediating role of attention in the relationship between mindfulness and emotion regulation has not been explored in any previous study, it is theoretically supported. As described in Chapter 1, attention is one of the most regularly cited underlying mechanisms of mindfulness (Arch & Craske, 2006; Holzel et al., 2011; Shapiro et al., 2006). It makes theoretical sense that attention would underlie the relationship between mindfulness and emotion regulation, as it plays a fundamental role in both constructs. Attention is at the core of mindfulness practice: an ability to pay deliberate attention to one's internal and external experience, (Kabat-Zinn, 1994; Shapiro et al., 2006), and is considered an important emotion regulation strategy (Gross, 1998). The mediating role of attention in this relationship is further supported by previous research proposing that an initial orienting of attention takes place before

more detailed emotion regulation strategies or higher-level thinking can occur, in the relationship between mindfulness and emotion regulation (Desrosiers et al., 2014), supporting that attention could be the active ingredient by which mindfulness and emotion regulation are related, as found in the mediation in the current study.

While the mediation was found to be significant for the sample as a whole (both the SEBD and control groups together), when looking at the groups separately, to identify whether the mediation existed in the SEBD and/or control groups alone, the results remained significant only in the control group. This was expected, as two of the three correlations for the variables included in the mediation (DERS-SDQ attention; SDQ attention-CAMM) were not significant in the SEBD group alone.

It is possible that due to a lower number of participants included in the SEBD sample for this analysis, there was not enough power to detect significant effects here. It is also possible that the SDQ attention subscale was not suitable for capturing difficulties in attention in this group (again there may have been issues with the self-reported nature of this scale) which meant the effect of attention in the mediation was not significant. However, it may also be that the relationships between emotion regulation, attention and mindfulness are not as strong in adolescents with SEBD in comparison to adolescents with no identified difficulties in these areas, or that attention does not play as fundamental a role in this group as compared to controls. Although previous research has shown significant relationships between emotion regulation, attention and mindfulness in those with SEBD (for example, Biegel et al., 2009; Tan & Martin, 2012; van der Oord et al., 2012; Zylowska et al., 2008), these studies were limited by very small sample sizes, therefore may not have provided reliable findings.

Nevertheless, these results provide important findings supporting a mediating role of attention in the relationship between mindfulness and emotion regulation, which has not been identified in any previous research before. It would be interesting to explore whether this effect is unique to adolescents with no identified difficulties, or whether it would also be significant in adolescents with SEBD given enough statistical power.

### Hypothesis 3:

Hypothesis 3 predicted there would be stronger relationships between emotion regulation, attention and mindfulness in adolescents with low levels of callous-unemotional traits compared to those with high levels.

The results showed there was a significant difference between adolescents with low levels of callous-unemotional traits and those with high levels of callous-unemotional traits on the correlation between the ERQ reappraisal subscale of emotion regulation and the CAMM measure of mindfulness ability, with a significant negative correlation in the high callous-unemotional trait group only. This showed that more use of cognitive reappraisal as an emotion regulation strategy was related to lower levels of mindfulness ability, but only in those with high levels of callous-unemotional traits. This did not support the direction of the hypothesis which predicted there would be stronger relationships between emotion regulation and mindfulness in adolescents with low levels of callous-unemotional traits compared to those with high levels. There were no other significant differences between the two groups.

Again, there has been no previous research looking at the relationships between emotion regulation, attention and mindfulness in adolescents with varying levels of callous-unemotional traits to compare these results to, however the prediction was

theoretically supported. Research has found that poor emotion regulation is associated more with adolescents with conduct problems who have low levels of callous-unemotional traits, compared to high levels. For example, adolescents with low levels of callous-unemotional traits tend to be hyper-responsive to emotional cues while adolescent with high levels of callous-unemotional traits tend to be hypo-responsive to these cues (Sebastian et al., 2012; Sharp et al., 2006). It was therefore predicted that mindfulness would be most relevant to adolescents with low levels of callous-unemotional traits, whose conduct problems stem more so from emotional reactivity and poor emotion regulation, compared to those with high levels of callous-unemotional traits, whose behaviour is more strongly influenced by callous traits, and stronger relationships between emotion regulation, attention and mindfulness would be found in those with low levels of callous-unemotional traits as a result.

Certainly, previous research has found that a meditation programme resembling a mindfulness-based intervention had greater effects on emotional symptoms in adolescents with low levels of callous-unemotional traits compared to those with high levels (McCabe, 2009). Although this effect was not found to be significant, this was attributed to the small sample, therefore the study probably being underpowered.

Perhaps, however, there are no significant differences between adolescents with low levels of callous-unemotional traits and those with high levels in relation to emotion regulation and mindfulness. This would support previous findings of similar relationships to self-regulation in both proactive and reactive aggression (assumed to coincide with high and low levels of callous-unemotional traits) (Xu et al., 2009).

However, in the current study, the SEBD group was split into those with low and high levels of callous-unemotional traits, leaving two groups of just 11 and 13 participants,

therefore it is likely that these samples were also too small, and did not have enough statistical power to detect significant differences.

The defensiveness in adolescents with conduct problems, and increased likelihood of social desirability effects as a result have been highlighted as an important limitation of using self-reported measures in this population (McCabe, 2009), which may have also played a role in the current findings.

In summary, this hypothesis was not supported, only one correlation between the ERQ reappraisal subscale and the CAMM measure of mindfulness was found to be significant, but in the opposite direction as predicted by the hypothesis. No other significant differences between adolescents with low levels of callous-unemotional traits and those with high levels of callous-unemotional traits were found on the correlations between emotion regulation, attention and mindfulness. It is likely that these analyses were underpowered, therefore would be worth being explored further in future research.

#### **4.5 Implications of the Present Study**

##### *Theoretical implications*

The findings from the current study can add to the theoretical models of emotion regulation, attention, and mindfulness in adolescents, particularly adolescents with SEBD. The findings show that the constructs of emotion regulation, attention and mindfulness were significantly correlated in this population when using certain measures, which can add to the theoretical understandings of each of the constructs. In particular, the results showed that emotion regulation and attention were related, which can add to the models of emotion regulation, and how attention may play a role



in emotion regulation strategies (for example, Gross, 2008). The results also showed that emotion regulation and mindfulness were related as well as attention and mindfulness, which can add to the theoretical explanations of mindfulness, and the existing evidence base demonstrating these relationships. Importantly, the current study has demonstrated a mediating effect of attention in the relationship between mindfulness and emotion regulation, which can add to the existing accounts of the mechanisms underlying mindfulness, and mindfulness-based interventions.

The unexpected direction of the correlations between attention and emotion regulation, and attention and mindfulness, when looking at the results from the flanker task could provide some interesting challenges to the existing evidence base. Further research should explore whether these findings are unique to this study, or whether they demonstrate that the specific type of attention that the flanker task taps into is unexpectedly related to certain emotion regulation strategies and to mindfulness.

### *Clinical implications*

These results also have implications for clinical interventions, particularly mindfulness-based interventions. The significant correlations between mindfulness and emotion regulation and attention, add to the support that mindfulness-based interventions are likely to have effects on emotion regulation and attention in adolescents with and without identified SEBD, therefore supporting their use to improve difficulties with emotion regulation and attention in both of these populations. The current findings directly support and can add to the rationale for interventions such as “Learning to BREATHE”, a mindfulness-based intervention designed to develop emotion regulation and attentional skills in adolescents (Metz et al., 2013). The findings also have implications for interventions in adolescents with

SEBD and support existing mindfulness-based interventions conducted in this population which have reported improvements specifically in emotion regulation and attention as well as general psychological well-being (for example, Bogels et al., 2008).

The significant mediating effect of attention in the relationship between mindfulness and emotion regulation also contributes to the understanding of how mindfulness-based interventions may work, and could also be considered in tailoring interventions to focus on this. Given the key role attention appears to play in the relationship between mindfulness and emotion regulation, interventions for adolescents could focus on this aspect and include specific components of attention training. Indeed, existing mindfulness-based interventions being used in schools (for example the “.b” mindfulness in schools programme) have incorporated specific elements of attention training with successful outcomes (Kuyken et al., 2013).

The central role of attention identified here could also have implications for other non-mindfulness attention training interventions for adolescents. Chapter 1 provided an overview of effective interventions to improve attention (for example gaze training (Wadlinger and Isaacowitz (2008), and clinical attention training (Siegle et al., 2007)) which could be considered for the current population also.

### *Educational implications*

Not only do the findings from the present study have important clinical implications, they can also be useful in educational settings as well. As described in Chapter 1, adolescents with SEBD are at a higher risk of lower educational achievements and expulsion from school (Fergusson & Woodward, 2000; Newton-Howes, 2004). It is

therefore important to develop necessary support to improve their educational experience. The findings that adolescents in pupil referral units have specific difficulties with attention and emotion regulation are important to consider when considering interventions or teaching approaches. It could be useful for educational settings to regularly assess these difficulties and tailor teaching to consider any difficulties, or put interventions in place. Difficulties in attention, for example, are likely to be important for education and will impact on adolescents' concentration and ability to learn. Interventions to improve attention have obvious implications here. Again, mindfulness-based interventions could also be useful here, and could be adapted to focus on attention, or being mindful of attending during lessons. Certainly, recent mindfulness-based interventions conducted in schools have shown positive outcomes (Hennelly, 2011; Kuyken et al., 2013).

#### **4.6 Strengths of the present study**

##### *Method*

The current study had a number of strengths. Firstly, a number of different methods were combined to measure the constructs of emotion regulation and attention, including teacher-rated questionnaires and cognitive tasks as well as self-report questionnaires. The cognitive tasks allowed certain aspects not easily captured by questionnaires to be measured, for example, the flanker task directly measures actual performance on attention tasks, which self-report measures cannot access. The use of several measures enabled some of the limitations of using only self-report measures to be overcome and allowed the constructs to be measured more completely.

### *Sample*

Additionally, the sample used in the study was ethnically diverse (across both SEBD and control groups), which overcomes the limitation of having a predominantly white, middle class sample as has been the case in previous research in this area (for example, Huppert & Johnson, 2010), meaning the findings may be more generalisable across ethnicity and culture.

The study also benefitted from the use of a non-clinical control group of adolescents attending mainstream schools. This allowed comparisons to be made in those with and without identified SEBD, to see whether certain relationships were present only in one group compared to the other. Finally, this study was the first study to investigate the mediating role of attention in the relationship between mindfulness and emotion regulation in this sample, and has provided interesting findings to be explored further.

### **4.7 Limitations of the present study**

#### *Power*

Despite these strengths, the study also had a number of limitations. The sample size and power of the study, in particular, was an important limitation. Although 29 and 30 participants were recruited in the SEBD and control groups respectively (enough to reach statistical significance according to the a priori power analysis conducted), due to smaller numbers of participants in the SEBD group actually completing the cognitive tasks, the power is likely to have been reduced. This may explain why some correlations were found to be significant in the control group but not in the SEBD group. Furthermore, for the analyses looking at differences between those with low

and high levels of callous-unemotional traits, the samples were even smaller, with just 11 participants included in the SEBD group with low levels of callous-unemotional traits and 13 in the group with high levels of callous-unemotional traits. Given these very small numbers, it is highly likely there was not enough statistical power here to detect significant correlations and/or significant differences between these groups.

The a priori power analysis conducted was based on a previous study which was similar to the current study in the variables explored (emotion regulation and mindfulness), and the analyses used (correlation and mediation analyses), however it differed in the sample (young adults) and tasks used (used only self-report measures). While this power analysis was helpful to provide an estimated sample size, the effect size used is likely to be different from the actual effect found the current study, therefore it is possible that this power estimation was not sufficient. Together with the missing SEBD data, this meant that some of the analyses in the current study were likely to have been underpowered, meaning that certain effects may not have reached statistical significance.

### *Participation*

Due to the opt-in procedures, in one school both parents/carers and the pupils had to opt-in to take part in the study, in the other schools just pupils had to opt-in and consent from parents was gained via opt-out procedures. In both cases, however, it is possible that the participants who were willing and chose to take part in the study differed from those who were not willing to participate. In the SEBD group, it may have been that those with higher levels of SEBD or even more specifically callous-unemotional traits, were less willing to take part, therefore biasing the sample.

### *Confounding factors*

There were some significant differences between the SEBD and control group which may have reflected some confounding factors. Although the sample in general was ethnically diverse, there were significant differences in ethnicity between the two groups, with higher numbers of Black and Asian participants in the control group, but higher numbers of White, Mixed and Other ethnicities in the SEBD group. There were significant differences between the IQ levels of the two groups: the SEBD group had significantly lower total IQ levels compared to the control group, which may have confounded the results.

However in the current study, fewer significant differences between the two groups than predicted were found, meaning these demographic differences were unlikely to have had an effect. The times at which data were collected also differed across the schools depending on when they opted-in to take part in the study. For example, data were collected at one school in September, but from another in February. It is possible that there may have been differences in terms of stress, attention and concentration levels in September (the start of a new term, or new school for Year 7) compared to February, which may have led to differences in performance on the attention related task or on reports of attention and behaviour, which may have also affected the results.

### *Measures*

Some of the measures used in this study also have limitations. The CAMM measure of mindfulness ability, for example, measures a lack of mindfulness (in other words, mindlessness), rather than mindfulness directly. For example, items include “I think

about things that have happened in the past instead of thinking about things that are happening right now” where the presence of mindfulness is inferred from the absence of mindlessness, something that has been criticised (Chiesa, 2012). Richie and Bryant (2012) found support that trait mindfulness and trait mindlessness only share around 6% of their variance, demonstrating that they are distinct constructs, therefore limiting measures like this.

### *Analyses*

It is worth considering the effects of conducting multiple analyses, particularly in the correlation analyses, where multiple correlations were looked at, which could have increased the likelihood of Type I error. Bonferroni corrections were used to minimise this in the correlation analyses, and it was reported whether the correlations survived this correction or not. However, the majority of significant correlations were in the predicted direction based on existing studies into relationships between these constructs, therefore it is unlikely that Type 1 errors play a significant role in the reported findings.

### *Causality*

Finally, as the current study was correlational in nature, causality cannot be inferred. Although a mediation analysis was conducted, which posits a causal relationship between the variables, due to the data being correlational, the directionality of the relationship cannot be proved for certain. The analyses, however, provide provisional support for the theoretically motivated mediation model.

#### **4.8 Further research**

The current study has produced some interesting findings which would be important to replicate in future studies with larger sample sizes to overcome any limitations with statistical power. This would be particularly true for the SEBD sample, to identify whether this group differed from controls, and whether the mediating role of attention was present in this population with enough power. Exploring these findings in adolescents with varying levels of callous-unemotional traits could be done to see if there were significant differences between these groups in larger samples.

Given the limitation of correlational research in not being able to infer causality, it would be interesting for future research to address the current research questions longitudinally. For example, research could explore whether mindfulness ability at Time 1 predicts emotion regulation abilities at Time 2, and whether this is mediated by attention.

Additionally, studies could explore the effects of different interventions, for example explore whether mindfulness-based interventions lead to improvement in mindfulness, whether these predict improvements in emotion regulation, and whether any differences exist between an SEBD sample and a control group. It would be interesting as well to identify whether an attention training intervention (as opposed to a mindfulness-based intervention) could achieve the same effects given the mediating role of attention found, which would support the importance of the attentional component.

In the current study, there were different findings on the self- and teacher-rated measures for some variables. It would be useful for future research to continue to use



a number of methods to measure these constructs, and perhaps use parent-rated report as well as an additional other-rated measure.

The findings from the current study have provided preliminary findings supporting the relationships between emotion regulation, attention and mindfulness in adolescents with SEBD and in a control group. Future research should address interventions to improve emotion regulation and attention, in these population. Research should continue to explore the effects of mindfulness interventions with adolescents with SEBD, given that those that have been conducted have been with very small samples (for example, Biegel et al., 2009, Tan & Martin, 2012). It might be interesting for interventions to consider the important role of attention in this relationship, given the significant mediating role found, and tailor interventions to focus on this aspect.

Considering the mindfulness literature more generally, the differences in conceptualisation and operationalisation of mindfulness across studies has been criticised. It has been said that researchers have been allowed to develop their own definitions and operationalisations of mindfulness which has created conceptual discrepancies in the research (Chambers et al., 2009). Future research should continue to develop a universally-accepted definition, conceptualisation and operationalisation of mindfulness to aid comparison between future studies.

#### **4.9 Conclusions**

In conclusion, the present study aimed to explore the relationships between emotion regulation, attention and mindfulness in a sample of adolescents with SEBD and in control participants. The study also looked specifically at the mediating role of

attention in the relationship between mindfulness and emotion regulation, as well as the relationships between emotion regulation, attention and mindfulness in adolescents with varying levels of callous-unemotional traits.

The findings suggested that there were significant relationships between emotion regulation, attention and mindfulness in adolescents with SEBD as well as in the control group, when using particular measures of these variables. The findings also revealed a significant mediating effect of attention in the relationship between mindfulness and emotion regulation, although this was only significant in the sample as a whole, and the control group alone, and not in the SEBD group alone. Finally, the findings suggested there were very few significant differences in the correlations between emotion regulation, attention and mindfulness in those in the SEBD group with low levels of callous-unemotional traits as compared to those with high levels of callous-unemotional traits. These findings are important to add to the existing theories surrounding emotion regulation, attention and mindfulness in adolescents, particularly in adolescents with SEBD, where research is more limited. They also have important implications for developing interventions for this population, to support them in both clinical and educational settings.

Previous research has shown that relationships between emotion regulation, attention and mindfulness exist, in line with the findings of the current study. There has been no previous research which has looked at the mediating role of attention, however this is theoretically supported by theories of mindfulness and emotion regulation. Again, no previous research has explored the relationships between these constructs in adolescents with varying levels of callous-unemotional traits, so comparisons between the current findings and existing evidence base cannot be made, but this is also

grounded in theories of conduct problems and callous-unemotional traits, which suggest differences in emotion regulation exist between those with low and high levels of callous-unemotional traits.

While the current findings can provide some support for the theories underlying the constructs of emotion regulation, attention and mindfulness, and can provide further evidence that these relationships exist in a sample of adolescents with SEBD, further research should continue to explore these constructs in those with SEBD, given the limited sample size here. It would be interesting to see if future studies replicate the finding of a significant mediating role of attention in the relationships between mindfulness and emotion regulation, given this is the first study to demonstrate this. Considering the even smaller sample when looking at those with low compared to high levels of callous-unemotional traits, future studies should explore these constructs in these populations, which could perhaps lead to tailored interventions to support these groups.

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## Appendices

### Appendix 1: Ethical approval

To: [ztjt200@rhul.ac.uk](mailto:ztjt200@rhul.ac.uk); Sebastian, Catherine;

Cc: [PSY-EthicsAdmin@rhul.ac.uk](mailto:PSY-EthicsAdmin@rhul.ac.uk); Leman, Patrick; Lock, Annette; [umjt001@rhul.ac.uk](mailto:umjt001@rhul.ac.uk);

Application Details: View the form click [here](#) Revise the form click [here](#)

Applicant Name: **Pip Bullemor-Day**

Application title: **Mindfulness, attention and emotion regulation in adolescents with social, emotional and behavioural difficulties.**

Comments: Approved.

Reviewer comments below for information.

Reviewer 1. In my view it would be good practice if all consent sheets made it clear that in the event that certain scores indicate mental health issues of concern, then there is a plan in place to pass information on to the school and parent Ideally a sample wording of how this might be done in practice would be included in this application. Q10 in section B clearly should have been ticked as "Yes", given that the researchers themselves claim that some of their questions "may be upsetting or distressing for some adolescents". Otherwise OK, as long as though Ps and teachers are reminded on the questionnaires that they can leave out Qs without giving a reason and without any consequence, if they wish to. Is parental consent also necessary for the issue of passing on details about the answers to the school? Just wondering, as the researchers say that the school as well as parents will be informed if any scores indicate mental health issues.

Reviewer 2. A thorough application; all relevant ethical issues appear to have been considered and addressed.

## PSYCHOLOGY DEPARTMENT ETHICS APPROVAL FORM REF: 2014/044R1

PLEASE COMPLETE ALL PARTS OF THE FORM AND CHECKLIST. APPEND INFORMATION AND CONSENT FORM(S) AND ANY OTHER MATERIALS IN SUPPORT OF YOUR APPLICATION

### Section A

1. Is this a new proposal or a revision to existing proposal?

☐ New ☒ Revision

DEC Reference: 2014/044

Please detail the changes you are making to the previous submission

We would like to make some minor amendments to this application.

1) While our application was approved, one of the reviewers asked for clarification of our plan in case we had concerns regarding a participant's mental health. While our questionnaires ask about internalising and externalising symptoms, none are diagnostic and so on balance we think it would not be appropriate to choose a threshold at which we automatically break participant confidentiality. Instead, we will only break confidentiality if a participant says something to us that leads us to believe they pose a danger to themselves or others. In such a case, we would notify our contact teacher in the school, as we will not have direct contact with parents. Teachers would then follow school child protection procedure regarding the next steps. We have added information to this effect to parent and child information sheets (see first attachment).

2) We would like to request permission to access information regarding participant diagnoses, medication and education statements from participants' schools. This would be accessed either through teachers or directly from school records. This is because it is important for us to know of any diagnoses or medications that may influence performance on our task battery. Children in SEBD settings often have co-morbid conditions such as ADHD, anxiety and depression, and are prescribed medications for these. As these comorbidities occur often, excluding participants with these conditions would lead to recruiting an unrepresentative sample. However, it would be useful to know about these so that they can be accounted for in analyses.

3) We would like to add an exclusion criterion of an autism spectrum disorder (ASD) diagnosis. This is because children with ASD are sometimes enrolled in SEBD schools; however, the nature of their social difficulties qualitatively differs from those of the group of primary interest ('SEBD' as defined for the purposes of the current study corresponds loosely to DSM-V diagnoses of oppositional defiant disorder and conduct disorder).

4) We would like to add one more questionnaire to the child self-report battery. This is the 10-item 'Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA; Gullone & Taffe, 2012, see second attachment). This will give us valuable information about participants' access to specific emotion regulation strategies (specifically suppression and reappraisal). It should take no more than 5 minutes to complete and is unlikely to cause any distress.

2. Project start date      04/04/2014      dd/mm/yyyy
3. Project end date      30/06/2015      dd/mm/yyyy

1 of 6

18/11/2014 11:37

Ethics Approval Form

[http://www.pc.rhul.ac.uk/Staff\\_intranet/EthicsApproval/DisplayF...](http://www.pc.rhul.ac.uk/Staff_intranet/EthicsApproval/DisplayF...)

4. Please indicate the most appropriate description of the research:

☐ Academic staff   ☐ PhD   ☐ Student project (BSc and MSc)   ☒ DClIn Psy

Staff/Supervisor Name: Catherine Sebastian

5. Title of project

Mindfulness, attention and emotion regulation in adolescents with social, emotional and behavioural c

6. Name of Researcher(s)

Name: Pip Bullemor-Day	Email: pip.day.2008@live.rhul.ac.uk
Name: Catherine Sebastian	Email: catherine.sebastian@rhul.ac.uk
Name: Tamsin Owen	Email: tamsin.owen@rhul.ac.uk
Name:	Email:
Name:	Email:
Name:	Email:

7. Last changes to the form were saved by: Catherine Sebastian at 21/05/2014 17:49:48

8. Is this project funded?  
☐ Yes ☒ No
9. In your view, does the project require NHS ethical approval?  
☐ Yes ☒ No
- 

**Section B**

1. Will you describe the main experimental procedures to participants in advance, so that they are informed about what to expect?  
☒ Yes ☐ No
2. Will you tell participants that their participation is voluntary?  
☒ Yes ☐ No
3. Will you obtain written consent for participation?  
☒ Yes ☐ No
4. Will you tell participants that they may withdraw from the research at any time and for any reason?  
☒ Yes ☐ No
5. With questionnaires, will you give participants the option of omitting questions they do not want to answer? (If you are not using questionnaires, please answer Yes to this question.)  
☒ Yes ☐ No
6. Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?  
☒ Yes ☐ No
7. Will you debrief participants at the end of their participation (i.e. give them a brief explanation of the study)?  
☒ Yes ☐ No

8. Will your project involve deliberately misleading participants in any way?  
☐ Yes ☒ No
9. Will your project involve TMS, EEG or similar physiological methods or an MRI experiment without previous ethics approval?  
☐ Yes ☒ No
10. Is there any realistic risk of any participants experiencing either physical or psychological distress or discomfort?  
☐ Yes ☒ No
11. Does your project involve work with animals?  
☐ Yes ☒ No
12. Will any of your participants fall into any of the following groups?

	Yes	No
Young people (under 16 years of age)	<input checked="" type="radio"/>	<input type="radio"/>
People with learning or communication difficulties.	<input checked="" type="radio"/>	<input type="radio"/>
Patients.	<input type="radio"/>	<input checked="" type="radio"/>
People in custody.	<input type="radio"/>	<input checked="" type="radio"/>
People engaged in illegal activities. (e.g. drug taking).	<input type="radio"/>	<input checked="" type="radio"/>

### Section C

1. Purpose of project and its academic rationale.

The purpose of the project is to explore relationships between mindfulness, attention and emotion regulation (ER) in adolescents with social, emotional and behavioural difficulties (SEBD). In particular, we will focus on the mediating role of attention in these relationships and the effect of varying levels of callous-unemotional traits.

ER refers to "processes responsible for monitoring, evaluating and modifying emotional reactions" (Thompson, 1994). Poor ER is central to SEBD in adolescents (McLaughlin et al., 2011).

Mindfulness programmes have reported improvements in behaviour, mood, and attention in mainstream adolescents and in those with SEBD (Bogels et al., 2008; Kuyken et al., 2013; Zylowska et al., 2008), by supporting the development of ER skills (Metz et al., 2013). Despite this growing evidence base, less is known about the mechanisms through which mindfulness affects ER (Desrosiers et al., 2013).



Attention is the fundamental concept of mindfulness: paying attention to one's internal and external experience (Shapiro et al., 2006). Attention also plays a key role in ER. Hayes and Feldman (2004) proposed emotions are regulated by attention. For example, attention can be used to distract from distressing emotions, or to over-engage with the source of distress, which requires attention to be shifted from the present, to past or future events. In contrast, mindfulness involves training attention to shift from past or future events to the present moment.

While previous studies have explored the effects of mindfulness interventions generally, and found effects on attention and ER separately (Bogels et al., 2008; Kuyken et al., 2013), no study has examined the relationships between all three constructs (mindfulness, ER and attention), and particularly in those with SEBD, where there is a pressing need to understand how to improve ER. Research has looked at mediators of the relationship between mindfulness and ER (e.g. Hill & Updegraff, 2012), including emotion differentiation and emotion lability, however no study has explored the mediating role of attention. This study aims to address this hypothesis in adolescents with SEBD and matched controls. Finally, this study will use novel cognitive together with questionnaire measures of ER and attention.

This project will also assess whether these relationships vary depending on levels of callous-unemotional traits (CU; a lack of guilt and empathy and a callous use of others (Frick & White, 2008). A previous evaluation of a meditation program conducted with adolescents with conduct problems (CP) found greater effects on emotional symptoms in those with low levels of CU (LCU) compared to high levels (HCU) (McCabe,

2009). This is in line with biopsychosocial theories of CP and evidence suggesting that emotion processing and regulation difficulties differ between those with LCU vs. HCU (Frick et al., 2003). Specifically, those with HCU tend to be hypo-responsive to emotional cues, while LCU tend to be hyper-responsive (Sharp et al., 2006; Viding et al., 2012). Mindfulness is thus expected to be most relevant to LCU, whose CP stem from emotional reactivity and poor ER, vs. HCU, where behaviour is more strongly influenced by callous traits.

It is hypothesised that positive correlations between mindfulness, ER, and attention in adolescents with SEBD will be found. Considering the fundamental role of attention, it is hypothesised that the relationship between mindfulness and ER will be mediated by attention. Finally, it is hypothesised that stronger relationships between all variables will be seen in those with LCU.

These findings will shed light on cognitive mechanisms underlying improvements in ER, and add to the rationale for using mindfulness programmes with adolescents with SEBD. It may also provide evidence for tailoring interventions based on levels of CU traits.

## 2. Brief description of methods and measurements.

A cross-sectional, correlational design will be used. Measures will be developed into a computerised battery which participants will complete individually with the researcher in school. This is estimated to take approx. 45 minutes.

### Measures:

#### Computer Tasks:

An Emotional N-back task will be used to measure implicit ER performance. This will follow a 2 (task: 0-back, 2-back) x 4 (distractor: no distractor, fearful faces, happy faces, calm faces) blocked factorial design. Participants will be shown either single digit numbers only, or in the distractor conditions, 2 identical emotional or calm faces flanking the numbers on each side. In the 0-back task participants will indicate whether the number was a zero; in the 2-back task they will indicate whether the number on the screen is the same as the number presented two trials before. This will provide specific information on distractibility by emotion which may reflect hypervigilance to emotion as well as poor attentional engagement, processes that are not well-captured by self-report measures. Please note: While this task has been used with typically developing adolescents, it is possible that those with SEBD will perform at floor on the 2-back condition. If piloting shows this, the 2-back condition will be replaced with a 1-back condition.

A Flanker task (Eriksen & Eriksen, 1974), will be used to assess selective attention. Here, participants will indicate which direction a central arrow, flanked by congruently or incongruently facing arrows, is pointing.

#### Self-report questionnaires:

The Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004) will be used as a self-report measure of ER. This is a 36-item scale assessing difficulties in ER on a 5-point Likert scale. It has a Cronbach's alpha of 0.92 and good reliability and validity (Neumann et al., 2010).

The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) will also be used. This is a 25-item measure of emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems and pro-social behaviour. It is a widely used measure with good psychometric properties (Cronbach's alpha of 0.73).

The Child and Adolescent Mindfulness Measure (Greco, et al., 2010) will be used to measure mindfulness. This is a 10-item measure with good internal consistency (0.80), good convergent and incremental validity. Standard demographic data including age, gender, handedness, SES, and ethnicity will also be collected. IQ will be measured using the Matrices and Vocabulary subtests of the Wechsler Abbreviated Scale of Intelligence-II (WASI-II, Psychological Corporation, 2011), a validated brief measure of IQ. This will be used to match the 2 groups on non-verbal IQ and provide an overall estimate of general ability. Group matching will be performed on the basis of non-verbal IQ, a standard approach with SEBD samples, due to common comorbid literacy difficulties.

Due to comorbid literacy difficulties in adolescents with SEBD, the researcher will help participants to complete the questionnaires if required.

#### Teacher-rated questionnaires:

The following teacher-rated scales will be used to limit difficulties with self-report, to limit the battery length for participants and to gain an external perspective on their behaviour.

The conduct problem scale (5 items) of the SDQ will be used to measure levels of conduct problems (Goodman, 1997).

The ASI-4 (Gadow & Sprafkin, 1998) conduct disorder 9-item scale will also be used to determine levels of conduct problems. The ASI-4 is a behaviour rating scale which correlates well with other scales of psychopathy (Gadow & Sprafkin, 1998). The Inventory for Callous-unemotional traits (ICU; Frick, 2004) will be used to measure CU traits. This is a 24-item 4-point Likert scale. It has good internal consistency (0.81) and good construct and convergent validity.

3. Participants: Recruitment methods, number, age, gender, exclusion/inclusion criteria.

Participants:

The sample for this project will be a non-clinical sample of male and female adolescents aged 11-16 years with SEBD attending Pupil Referral Units and/or specialist SEBD secondary schools across London and Surrey. It is expected that there will be more males than females due to the ratios in SEBD schools. The control group sample will be pupils the same age attending mainstream secondary schools matched for non-verbal IQ and SES.

Exclusion criteria:

Adolescents who are illiterate, and/or who cannot read English and therefore cannot complete the task battery will be excluded from the study. Participants who have high levels of literacy difficulties but do not meet this exclusion criteria will be included, and measures can be read aloud by the researcher to aid participation and understanding.

A power analysis was conducted to estimate the required sample size for this study using data from Hill and Updegraff (2012), which studied the relationships between mindfulness and ER in young adults. This study used a similar measure of mindfulness (the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006), developed by the same authors of the CAMM, which will be used in the proposed study), and the Difficulties in Emotion Regulation Scale (DERS), which will be used in the proposed study. It also used the same analysis that will be used, i.e. looking at correlations between mindfulness and ER, as well as mediation analysis to explore factors mediating this relationship. Hill and Updegraff (2012) reported a large effect size ( $r = -0.58$ ). The regression analysis used in this study identified which subscales of mindfulness predicted ER difficulties, using three predictors. A power analysis based on this data estimates that a sample size of 34 participants would be required to determine an effect at a standard alpha level of 0.05 with 80% power (Cohen, 1992).

The study will therefore aim to recruit 34 SEBD participants and 34 matched controls.

Setting:

Testing will take place on school sites (mainstream, PRU and SEBD schools). The contact details for schools that may be suitable and interested in participating will be gained through the researcher and supervisors. Emails and letters introducing and outlining the project and what it will entail for participants, including benefits and incentives to participate will be sent. These will be followed up later, where there will be the opportunity to discuss any questions regarding participation.

Schools will be opportunistically sampled based on proximity and willingness to engage. If more schools/participants are available to participate than required, these will be chosen at random to ensure an unbiased sampling element.

4. Consent and participant information arrangements, debriefing.

Both participant and parental consent will be obtained prior to data collection. Parental opt-out consent will be sought to facilitate the consent process, as has been used previously in school-based studies in the department. Consent forms containing information about the purpose of the study, what participating will entail for the students and information about confidentiality and anonymity of participants (see Appendix 1) will be sent home prior to data collection. Parents will have the opportunity to opt-out of the study if they do not wish for their child to take part. This method of consent was chosen as it has previously been used in this population due to low engagement and response rates from parents.

Individual written consent from participants will be obtained immediately prior to testing. The purpose of the research, what they will have to complete, and how data will be used will be explained to each participant before completing the questionnaires and tasks. Participants will be made aware of confidentiality and the limits to it, including that if any concerns regarding their well-being arise from the questionnaires, it may be necessary to discuss this with their teacher and/or parent/carer. Participants will be informed of their right to withdraw at any time, and there will be an opportunity for participants to ask the researcher any questions they may have. They will be advised to contact the researcher in the future if they have any concerns about

their information being used.

We will also provide information sheets and gain consent from the teachers who complete the measures to use their data (See Appendix 1).

All participants will be given a debriefing information sheet (See Appendix 2), which will include information about where to seek further advice and support if they experience any distressing symptoms. In the unlikely event that participants feel distressed immediately following completion of the questionnaire, participants will be advised to contact their class teacher to discuss any concerns.

If any concerns regarding the participant's well-being arise during data collection or upon scoring the measures, the researcher will liaise with Dr Catherine Sebastian and Dr Tamsin Owen, Academic Supervisors as well as the participant's class teacher/school as soon as possible.



5. A clear concise statement of the ethical considerations raised by the project (if any) and how you intend to deal with them.

This project requires the participation of children aged 11-16, therefore some important ethical issues must be considered.

Some of the measures used ask about potentially sensitive issues e.g. symptoms of anxiety and depression, which may be upsetting or distressing for some adolescents. Participants will be informed that they can stop or withdraw from the study at any point. This will be made particularly clear if participants appear to experience distress during the study. Data will be collected in schools to ensure participants are in a familiar environment, hopefully minimising any anxiety caused.

Participants and their parents/carers will be briefed on what the testing will entail and the types of questions they will be asked prior to participation both in the form of a detailed information sheets and verbally at the time of participation. Participants who experience any distress following participation will be advised to speak to their class teacher. A debrief form will also provide information and contact details of organisations participants can contact if they have any concerns about their emotions after taking part.

Of particular importance in this study is the potential for some of the measures, e.g. the SDQ, to reveal whether participants are displaying a high levels of mental health symptoms or may be at risk of developing them, which may require further professional advice or support. The university's guidelines on how to deal with these circumstances, including making the school and young person's parents/carers aware if necessary will be followed. As a Trainee Clinical Psychologist, the researcher has experience working with children and adolescent with mental health problems and has received training and supervision in managing emotional difficulties and safeguarding concerns. The project's supervisors will be available to offer advice and support with safeguarding concerns if necessary.

#### Section D

Information and consent forms and other materials

[Info sheets and consent forms amended May2014.docx](#)   No file selected.

[ERQ-CA.doc](#)   No file selected.

No file selected.

Ethics forms can only be submitted by a member of Academic Staff in the Department of Psychology. Submitting this form confirms that all applicants are familiar with the British Psychological Society's guidelines for ethical practices in research and that all applicants have read and approve the content of this submission.

## Appendix 2: Difficulties in Emotion Regulation Scale

### **Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004)**

Response categories: 1. Almost never (0-10%); 2. Sometimes (11-35%); 3. About half the time (36-65%); 4. Most of the time (66 – 90%); 5. Almost always (91-100%).

1. I am clear about my feelings.
2. I pay attention to how I feel.
3. I experience my emotions as overwhelming and out of control.
4. I have no idea how I am feeling.
5. I have difficulty making sense out of my feelings.
6. I am attentive to my feelings.
7. I know exactly how I am feeling.
8. I care about what I am feeling.
9. I am confused about how I feel.
10. When I'm upset, I acknowledge my emotions.
11. When I'm upset, I become angry with myself for feeling that way.
12. When I'm upset, I become embarrassed for feeling that way.
13. When I'm upset, I have difficulty getting work done.
14. When I'm upset, I become out of control.
15. When I'm upset, I believe that I will remain that way for a long time.

16. When I'm upset, I believe that I'll end up feeling very depressed.
17. When I'm upset, I believe that my feelings are valid and important.
18. When I'm upset, I have difficulty focusing on other things.
19. When I'm upset, I feel out of control.
20. When I'm upset, I can still get things done.
21. When I'm upset, I feel ashamed with myself for feeling that way.
22. When I'm upset, I know that I can find a way to eventually feel better.
23. When I'm upset, I feel like I am weak.
24. When I'm upset, I feel like I can remain in control of my behaviors.
25. When I'm upset, I feel guilty for feeling that way.
26. When I'm upset, I have difficulty concentrating.
27. When I'm upset, I have difficulty controlling my behaviors.
28. When I'm upset, I believe there is nothing I can do to make myself feel better.
29. When I'm upset, I become irritated with myself for feeling that way.
30. When I'm upset, I start to feel very bad about myself.
31. When I'm upset, I believe that wallowing in it is all I can do.
32. When I'm upset, I lose control over my behaviors.
33. When I'm upset, I have difficulty thinking about anything else.
34. When I'm upset, I take time to figure out what I'm really feeling.

35. When I'm upset, it takes me a long time to feel better.

36. When I'm upset, my emotions feel overwhelming.



### Appendix 3: Emotion Regulation Questionnaire

## Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA;

Gullone &amp; Taffe, 2010)

For each item, please answer using the following scale:

1-----2-----3-----4-----5

**strongly**
**half and half**
**strongly**

disagree agree

1. \_\_\_\_ When I want to feel happier, I think about something different
2. \_\_\_\_ I keep my feelings to myself.
3. \_\_\_\_ When I want to feel less bad (e.g. sad, angry or worried), I think about something different.
4. \_\_\_\_ When I am feeling happy, I am careful not to show it.
5. \_\_\_\_ When I'm worried about something, I make myself think about it in a way that helps me think better.
6. \_\_\_\_ I control my feelings by not showing them.
7. \_\_\_\_ When I want to feel happier about something, I change the way I'm thinking about it.
8. \_\_\_\_ I control my feelings about things by changing the way I think about them.
9. \_\_\_\_ When I am feeling bad (e.g. sad, angry, or worried) I'm careful not to show it.

10. \_\_\_\_ When I want to feel bad (e.g. sad, angry or worried) about something, I change the way I'm thinking about it.

## Appendix 4: Child and Adolescent Mindfulness Measure

**Child and Adolescent Mindfulness Measures (CAMM;** Greco, Baer, & Smith, 2011).

### **Child and Adolescent Mindfulness Measure (CAMM)**

We want to know more about what you think, how you feel, and what you do. **Read** each sentence. Then, circle the number that tells how often each sentence is true for you.

	Never True	Rarely True	Sometimes True	Often True	Always True
1. I get upset with myself for having feelings that don't make sense.	0	1	2	3	4
2. At school, I walk from class to class without noticing what I'm doing.	0	1	2	3	4
3. I keep myself busy so I don't notice my thoughts or feelings.	0	1	2	3	4
4. I tell myself that I shouldn't feel the way I'm feeling.	0	1	2	3	4
5. I push away thoughts that I don't like.	0	1	2	3	4
6. It's hard for me to pay attention to only one thing at a time.	0	1	2	3	4
7. I get upset with myself for having certain thoughts.	0	1	2	3	4
8. I think about things that have happened in the past instead of thinking about things that are happening right now.	0	1	2	3	4
9. I think that some of my feelings are bad and that I shouldn't have them.	0	1	2	3	4
10. I stop myself from having feelings that I don't like.	0	1	2	3	4

## Appendix 5: Strengths and Difficulties Questionnaire (self-rated)

### Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997).

---

**Strengths and Difficulties Questionnaire**

For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain or the item seems daft! Please give your answers on the basis of how things have been for you over the last six months.

Your Name ..... Male/Female

Date of Birth.....

	Not True	Somewhat True	Certainly True
I try to be nice to other people. I care about their feelings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am restless, I cannot stay still for long	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I get a lot of headaches, stomach-aches or sickness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I usually share with others (food, games, pens etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I get very angry and often lose my temper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am usually on my own. I generally play alone or keep to myself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I usually do as I am told	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I worry a lot	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am helpful if someone is hurt, upset or feeling ill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am constantly fidgeting or squirming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have one good friend or more	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I fight a lot. I can make other people do what I want	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am often unhappy, down-hearted or tearful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other people my age generally like me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am easily distracted, I find it difficult to concentrate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am nervous in new situations. I easily lose confidence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am kind to younger children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am often accused of lying or cheating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other children or young people pick on me or bully me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I often volunteer to help others (parents, teachers, children)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

---

I think before I do things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I take things that are not mine from home, school or elsewhere	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I get on better with adults than with people my own age	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have many fears, I am easily scared	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I finish the work I'm doing. My attention is good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

---

Your signature ..... Today's date .....

**Thank you very much for your help**

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## Appendix 6: Strengths and Difficulties Questionnaire (teacher-rated)

### Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997).

#### Strengths and Difficulties Questionnaire

For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain or the item seems daft! Please give your answers on the basis of the child's behaviour over the last six months or this school year.

Child's Name .....

Male/Female

Date of Birth.....

	Not True	Somewhat True	Certainly True
Considerate of other people's feelings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restless, overactive, cannot stay still for long	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often complains of headaches, stomach-aches or sickness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shares readily with other children (treats, toys, pencils etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often has temper tantrums or hot tempers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rather solitary, tends to play alone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Generally obedient, usually does what adults request	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Many worries, often seems worried	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Helpful if someone is hurt, upset or feeling ill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Constantly fidgeting or squirming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has at least one good friend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often fights with other children or bullies them	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often unhappy, down-hearted or tearful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Generally liked by other children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easily distracted, concentration wanders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nervous or clingy in new situations, easily loses confidence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kind to younger children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often lies or cheats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Picked on or bullied by other children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often volunteers to help others (parents, teachers, other children)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thinks things out before acting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Steals from home, school or elsewhere	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gets on better with adults than with other children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Many fears, easily scared	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sees tasks through to the end, good attention span	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Signature .....

Date .....

Parent/Teacher/Other (please specify:)

### Appendix 7: Adolescent Symptom Inventory

Special permission from the author was given for the use of the conduct disorder scale of the Adolescent Symptom Inventory in the current study (available upon request).

However due to copyright restrictions it was not included in the appendices.

## Appendix 8: Inventory of Callous-Unemotional traits

### **Inventory of Callous-Unemotional Traits (ICU; Frick, 2004).**

Instructions: Please complete the background information above. Then read each statement and decide how well it describes the student. Mark your answer by circling the appropriate number (0-3) for each statement. Do not leave any statement unrated.

	Not at all True	Somewhat True	Very True	Definitely True
1. Expresses his/her feelings openly	0	1	2	3
2. Does not seem to know "right" from "wrong"	0	1	2	3
3. Is concerned about schoolwork	0	1	2	3
4. Does not care who he/she hurts to get what he/she wants	0	1	2	3
5. Feels bad or guilty when he/she has done something wrong	0	1	2	3
6. Does not show emotions	0	1	2	3
7. Does not care about being on time	0	1	2	3
8. Is concerned about the feelings of others	0	1	2	3
9. Does not care if he/she is in trouble	0	1	2	3
10. Does not let feelings control him/her	0	1	2	3
11. Does not care about doing things well	0	1	2	3
12. Seems very cold and uncaring	0	1	2	3
13. Easily admits to being wrong	0	1	2	3
14. It is easy to tell how he/she is feeling	0	1	2	3
15. Always tries his/her best	0	1	2	3
16. Apologizes ("says he/she is sorry") to persons he/she has hurt	0	1	2	3
17. Tries not to hurt others' feelings	0	1	2	3
18. Shows no remorse when he/she has done something wrong	0	1	2	3
19. Is very expressive and emotional	0	1	2	3
20. Does not like to put the time into doing things well	0	1	2	3
21. The feelings of others are unimportant to him/her	0	1	2	3
22. Hides his/her feelings from others	0	1	2	3
23. Works hard on everything.	0	1	2	3
24. Does things to make others feel good	0	1	2	3

#### Appendix 9: Wechsler Abbreviated Scale of Intelligence-II

Due to copyright restrictions a copy of the Wechsler Abbreviated Scale of Intelligence-II was not included in the appendices.



## Appendix 10: Parental opt-in consent form

### Department of Psychology

Royal Holloway, University of London

Egham, Surrey TW20 0EX, UK

[www.rhul.ac.uk](http://www.rhul.ac.uk)



### **Parental Information Sheet and Opt-in Consent** **How are mindfulness, attention and emotions related in adolescents?**

Dear Parent/Guardian,

My name is Pip Bullemor-Day and I am studying for a Doctorate in Clinical Psychology at Royal Holloway, University of London. As part of this, I am conducting research on social and emotional development in adolescence. I would like to invite your child to take part in some exciting new research looking at how mindfulness (paying attention to the present moment) and abilities to regulate emotions are linked in adolescents. If you would like to discuss any aspect of the research with me, please feel free to email me at [pip.day.2008@rhul.ac.uk](mailto:pip.day.2008@rhul.ac.uk).

I would appreciate it if your child could participate in this study, as we currently know relatively little about the links between attention, mindfulness (paying attention to the present moment) and the ability to control emotions are linked in adolescents in this age range. However, we do know that this age group is at particular risk of developing difficulties associated with poor emotion regulation, including depression, anxiety and aggressive behaviour. I hope the findings will shed light on how these constructs are linked which may help develop ways of reducing or preventing these difficulties in adolescents.

All pupils who take part in this study will complete a short computer game and questionnaire task lasting no more than 45 minutes in total. We will liaise with teachers to ensure that pupils do not miss vital lessons. The computer games will require pupils to complete simple memory or decision-making tasks in either the presence or absence of emotional pictures (e.g. happy or fearful faces). Questionnaires will ask pupils about their moods, feelings and behaviour. They will also be given a short demographic questionnaire and a multiple choice measure of general ability. We will also ask a teacher who knows the child well to complete a questionnaire about their emotions and behaviour.

Only myself and members of my research team will have access to your child's data. All data will be stored confidentially and anonymously so that your child would not be identifiable from the data. Computerised data will be password-protected and/or encrypted for data protection purposes. Hard copy data will be stored in a locked filing cabinet. Adolescents will be allowed to withdraw from the study at any time without giving a reason if they do not wish to continue.

This study has been reviewed and approved by the Psychology Department internal ethical procedure at Royal Holloway, University of London. \_\_\_\_\_, Head of Centre, has also given permission for this study to be carried out. The members of the research team have been checked and cleared by the Disclosure and Barring Service (DBS, formerly CRB).

Your child's school has chosen an **opt-in** consent process. This means that if you are happy for your child to take part you must complete the opt-in form overleaf and return it to your child's class teacher by 26<sup>th</sup>

**September 2014**. Please retain this sheet for your future information. Thank you for taking the time to read this information.

Yours Sincerely,

**Pip Bullemor-Day**

**Trainee Clinical Psychologist**

Doctorate in Clinical Psychology, Department of Psychology

Royal Holloway, University of London, Egham, Surrey, TW20 0EX

Email: [pip.day.2008@rhul.ac.uk](mailto:pip.day.2008@rhul.ac.uk)

### **Opt-in form for parents and guardians**

I have received an information sheet explaining the purpose of the study and have had the opportunity to ask further questions.

I **give consent** for my son or daughter to participate in the above research to be carried out by Pip Bullemor-Day and her research team.

Please return this form to school by **26<sup>th</sup> September 2014**.

---

I consent to my son/daughter taking part in the research being conducted by Pip Bullemor-Day and her research team.

Signature of parent / guardian

.....

Name of parent/guardian (please print)

.....

Name of child

.....

Child's date of birth

.....

Child's form class

.....

Date

.....

## Appendix 11: Parental opt-out consent form

### Department of Psychology

Royal Holloway, University of London

Egham, Surrey TW20 0EX, UK

[www.rhul.ac.uk](http://www.rhul.ac.uk)



### Parental Information Sheet and Opt-Out Consent How are mindfulness, attention and emotions related in adolescents?

Dear Parent/Guardian,

My name is Pip Bullemor-Day and I am studying for a Doctorate in Clinical Psychology at Royal Holloway, University of London. As part of this, I am conducting research on social and emotional development in adolescence. I would like to invite your child to take part in some exciting new research looking at how mindfulness (paying attention to the present moment) and abilities to regulate emotions are linked in adolescents. If you would like to discuss any aspect of the research with me, please feel free to email me at [pip.day.2008@rhul.ac.uk](mailto:pip.day.2008@rhul.ac.uk).

I would appreciate it if your child could participate in this study, as we currently know little about how attention, mindfulness (paying attention to the present moment) and the ability to control emotions are linked in adolescents in this age range. However, we do know that this age group is at particular risk of developing difficulties associated with poor emotion regulation, including depression, anxiety and aggressive behaviour. I hope the findings will shed light on how these constructs are linked which may help develop ways of reducing or preventing these difficulties in adolescents.

All pupils who take part in this study will complete some short computer games and questionnaire task lasting no more than 45 minutes in total. We will liaise with teachers to ensure that pupils do not miss vital lessons. The computer games will require pupils to complete simple memory or decision-making tasks in either the presence or absence of emotional pictures (e.g. happy or fearful faces). Questionnaires will ask pupils about their moods, feelings and behaviour. They will also be given a short demographic questionnaire and a multiple choice measure of general ability. We will also ask a teacher who knows the child well to complete a questionnaire about their emotions and behaviour.

Only myself and members of my research team will have access to your child's data. All data will be stored confidentially and anonymously so that your child would not be identifiable from the data. Computerised data will be password-protected and/or encrypted for data protection purposes. Hard copy data will be stored in a locked filing cabinet. Adolescents will be allowed to withdraw from the study at any time without giving a reason if they do not wish to continue.

This study has been reviewed and approved by the Psychology Department internal ethical procedure at Royal Holloway, University of London. \_\_\_\_\_, the Head Teacher, has also given permission for this study to be carried out. The members of the research team have been checked and cleared by the Disclosure and Barring Service (DBS, formerly CRB).

Your child's school has chosen an **opt-out** consent process. This means that if you are happy for your child to take part, do nothing. However, if you do not want your child to take part you must complete the opt-out

*form overleaf and return it to your child's school by \_\_\_\_\_ date.* Please retain this sheet for your future information. Thank you for taking the time to read this information.

Yours Sincerely,

**Pip Bullemor-Day**

**Trainee Clinical Psychologist**

Doctorate in Clinical Psychology, Department of Psychology

Royal Holloway, University of London, Egham, Surrey, TW20 0EX

Email: [pip.day.2008@rhul.ac.uk](mailto:pip.day.2008@rhul.ac.uk)

### **Opt-out form for parents and guardians**

I have received an information sheet explaining the purpose of the study and have had the opportunity to ask further questions.

I **do not** wish for my son or daughter to participate in the above research to be carried out by Ms Pip Bullemor-Day.

Please return this form to \_\_\_\_\_ by \_\_\_\_\_.

---

I **do not** consent to my son/daughter taking part in the research being conducted by Ms Pip Bullemor-Day.

Signature of parent / guardian

.....

Name of parent/guardian (please print)

.....

Name of child

.....

Child's date of birth

.....

Child's form class

.....

Date

.....

## Appendix 12: Participant information sheet and consent form

### **Department of Psychology**

Royal Holloway, University of London

Egham, Surrey TW20 0EX, UK

[www.rhul.ac.uk](http://www.rhul.ac.uk)



### **Information Sheet: Adolescent Participants**

#### **How are mindfulness, attention and emotions related in adolescents?**

My name is Pip Bullemor-Day and I am currently studying for a Doctorate in Clinical Psychology at university (Royal Holloway, University of London). As part of this, I have to do a research project. I would like to invite you to take part in some exciting new research looking at how some things I am interested in (attention and how young people control their emotions) are linked to each other, in adolescents like you. If you would like to ask any questions about the study, please speak to a member of the research team now. It would be really helpful if you could take part, as at the moment we don't know very much about this subject.

If you decide to take part, you will complete several short computer games and questionnaires. The whole session will last no more than 45 minutes in total. The computer games will involve simple memory or decision-making tasks. Sometimes you will see emotional pictures during the games (e.g. happy or fearful faces). The questionnaires will ask you about your moods, feelings, and behaviour.

We will make sure that all your data is kept private and confidential. We will label it with a code, not your name, so that only the research team will be able to link your name with the information you give us. Not even your teachers will be allowed to see your data! All the information you provide will be stored securely outside the school. You don't have to take part in this study if you don't want to. You can decide to withdraw from the study at any time without having to give a reason. Also, while it would be helpful if you could answer every question, you can leave blank any questionnaire items you don't want to answer. This will not affect your education in any way.

If you choose to take part, you will be entered into a prize draw with the chance to win one of three prizes (£10, £20, £30 vouchers) to say thank you for helping us out.

Please feel free to ask any questions before you complete the consent form. You will only be allowed to start the study once the consent form is complete. This study has been reviewed and approved by the Psychology Department internal ethical procedure at Royal Holloway, University of London. This means it is considered safe for you to take part and that you will not come to any harm if you do.

✂

**How are mindfulness, attention and emotions related in adolescents?**

You have been asked to participate in a study about attention and emotion, which is being carried out by Pip Bullemor-Day. Have you (check the relevant tick box):

- |  |     |    |
|--|-----|----|
| • Read the information sheet about the study?  | yes | no |
| • Had an opportunity to ask questions?   | yes | no |
| • Got satisfactory answers to your questions (if any)?   | yes | no |
| • Understood that you're free to withdraw from the study at any time, without giving a reason and without it affecting your education? | yes | no |

Do you agree to take part in the study? yes no

Name (printed) \_\_\_\_\_ Name (signed) \_\_\_\_\_ Date \_\_\_\_\_

**NB: This consent form will be stored securely and separately from the rest of your data.**

## Appendix 13: Teacher information sheet, consent form, and initial questions.

### **Department of Psychology**

Royal Holloway, University of London

Egham, Surrey TW20 0EX, UK

[www.rhul.ac.uk](http://www.rhul.ac.uk)



### **Teacher Information Sheet and Consent** **How are mindfulness, attention and emotions related in adolescents?**

Dear Parent/Guardian,

My name is Pip Bullemor-Day and I am studying for a Doctorate in Clinical Psychology at Royal Holloway, University of London. As part of this, I am conducting research on social and emotional development in adolescence. I would like to invite your child to take part in some exciting new research looking at how mindfulness (paying attention to the present moment) and abilities to regulate emotions are linked in adolescents. If you would like to discuss any aspect of the research with me, please feel free to email me at [pip.day.2008@rhul.ac.uk](mailto:pip.day.2008@rhul.ac.uk)

I would appreciate it if you could participate in this study, as we currently know little about how attention, mindfulness (paying attention to the present moment) and the ability to control emotions are linked in adolescents in this age range. However, we do know that this age group is at particular risk of developing difficulties associated with poor emotion regulation, including depression, anxiety and aggressive behaviour. I hope the findings will shed light on how these constructs are linked which may help develop ways of reducing or preventing these difficulties in adolescents.

If you take part, you will be asked to complete some short questionnaires about each of your pupils that participates. These will include questions about their mood and behaviour, for which we require your consent.

Only myself and members of my research team will have access to your data. All data will be stored confidentially and anonymously so that you would not be identifiable from the data. Computerised data will be password-protected and/or encrypted for data protection purposes. Hard copy data will be stored in a locked filing cabinet. You will be allowed to withdraw from the study at any time without giving a reason if you do not wish to continue.

This study has been reviewed and approved by the Psychology Department internal ethical procedure at Royal Holloway, University of London. \_\_\_\_\_, the Head Teacher, has also given permission for this study to be carried out. The members of the research team have been checked and cleared by the Disclosure and Barring Service (DBS, formerly CRB).

Please retain this sheet for your future information. Thank you for taking the time to read this information.

Yours Sincerely,

**Pip Bullemor-Day**

**Trainee Clinical Psychologist**

Doctorate in Clinical Psychology, Department of Psychology  
Royal Holloway, University of London, Egham, Surrey, TW20 0EX  
Email: [pip.day.2008@rhul.ac.uk](mailto:pip.day.2008@rhul.ac.uk)

✂.....

**Teacher Consent form**

ID number.....

**How are mindfulness, attention and emotions related in adolescents?**

You have been asked to participate in a study about attention and emotion, which is being carried out by Pip Bullemor-Day. Have you (check the relevant tick box):

- |  |     |    |
|--|-----|----|
| • Read the information sheet about the study?  | yes | no |
| • Had an opportunity to ask questions?   | yes | no |
| • Got satisfactory answers to your questions (if any)?   | yes | no |
| • Understood that you're free to withdraw from the study at any time, without giving a reason and without it affecting your education? | yes | no |

Do you agree to take part in the study? yes no

Name (printed) \_\_\_\_\_ Name (signed) \_\_\_\_\_ Date \_\_\_\_\_

**NB: This consent form will be stored securely and separately from the rest of your data.**



## **Teacher Questionnaire Pack**

Pupil ID code: \_\_\_\_\_

Is the pupil:    Male   ☐       Female   ☐

What year group is the pupil in:                      7   ☐       8   ☐    9   ☐    10   ☐   11   ☐

How long have you known this pupil for? \_\_\_\_\_

How well do you know this pupil?    Not very well   ☐   Moderately well   ☐   Very well   ☐

Do you know if this pupil has any medical, neurological or psychological diagnoses you are aware of (e.g. Autism, ADHD)? If so, what?

---

---

Do you know if this pupil is on any prescribed medication? If so, what?

---

---

Does this pupil have a statement of special educational needs? If so, what for?

---

---

## Appendix 14: Debrief sheet for participants.

### **Department of Psychology**

Royal Holloway, University of London

Egham, Surrey TW20 0EX, UK



## **How are mindfulness, attention and emotions related in adolescents?**

### **Debrief for adolescents**

You have now reached the end of the study. Thank you very much for taking part. We hope that the results will help us to understand how attention, mindfulness (paying attention to the present moment) and controlling your emotions are related to each other in adolescents. We hope that this will help us to understand why some young people may develop emotional and behavioural difficulties and develop methods for helping to reduce or prevent these.

Our aim is for our findings to be published in academic journals. We may also discuss the data in talks or scientific posters. However, it is important for you to know that we will never talk about an individual's data or mention names. We will only talk about the general patterns that we have found across all the data.

If you are still happy to be included in the study, do nothing. However, if you would like your data to be removed from the study, please let one of the researchers know.

Advice and help: It is completely normal to feel strong emotions, and everyone gets angry or upset from time to time. However, some people experience these emotions particularly strongly, or end up feeling bad most of the time. In these people, emotions can have a negative effect on everyday life. If you are often distressed, angry or anxious, it may help to get some advice. You are welcome to ask the researcher now. You could also speak to your GP, an adult that you trust, or a counselling service like ChildLine (Tel: 0808 11 11; [www.childline.org.uk](http://www.childline.org.uk)) or Samaritans (Tel: 08457 90 90 90).

Thanks again and good luck with the prize draw! 😊